



AGRICULTURAL RESEARCH INSTITUTE
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Charles Ayres

YEAR-BOOK OF PHARMACY

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ABSTRACTS OF PAPERS

RELATING TO

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CONFERENCE

AT THE

THIRTY-FOURTH ANNUAL MEETING

HELD AT

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YEAR-BOOK OF PHARMACY AND TRANSACTIONS
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1896-97.

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THE BRITISH PHARMACEUTICAL CONFERENCE.

AN ORGANIZATION ESTABLISHED IN 1863 FOR THE ENCOURAGEMENT OF PHARMACEUTICAL RESEARCH, AND THE PROMOTION OF FRIENDLY INTERCOURSE AND UNION AMONGST PHARMACISTS.

THE most important ways in which a member can aid the objects of the Conference are by suggesting subjects for investigation, working upon subjects suggested by himself or by others, contributing information tending to throw light on questions relating to adulterations and impurities, or collecting and forwarding specimens whose examination would afford similar information. Personal attendance at the yearly gatherings, or the mere payment of the annual subscription, will also greatly strengthen the hands of the executive.

A list of subjects suggested for research is sent to members early in the year. Resulting papers are read at the annual meeting of the members; but new facts that are discovered during an investigation may be at once published by an author at a meeting of a scientific society, or in a scientific journal, or in any other way he may desire; in that case, he is expected to send a short report on the subject to the Conference.

The annual meetings are usually held in the provinces, at the time and place of the visit of the British Association; that for 1898 will be held at Belfast.

Gentlemen desiring to join the Conference can be nominated at any time on applying to the Secretary, or any other officer or member. The yearly subscription is payable in advance, on July 1st. The amount, which includes free delivery of the Year-Book, is 7s. 6d. for members residing within the Postal Union. Further information may be obtained from

THE ASST. SECRETARY; BRIT. PHARM. CONF.,
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THE YEAR-BOOK OF PHARMACY.

The Conference annually presents to members a volume of about 500 pages, containing the proceedings at the yearly meeting, and an Annual Report on the Progress of Pharmacy, or Year-Book, which includes notices of all pharmaceutical papers, new processes, preparations, and formulæ published throughout the world. The necessary fund for accomplishing this object consists solely of the subscriptions of members. The Executive Committee, therefore, call on every pharmacist—principal, assistant, or pupil—to offer his name for election, and on every member to make an effort to obtain more members. The price of the Year-Book to non-members is ten shillings. The constitution and rules of the Conference, and a convenient form of nomination, will be found at page 277.

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INTRODUCTION.

THE most notable feature of the pharmaceutical literature of the past year consists unquestionably in the very large increase in the number of new remedies which have been brought under notice. It is now about a dozen years since the assistance given by chemistry to therapeutics first took the shape of bringing "synthetical remedies" to the front; and it is but natural that the great success attending the initial steps in this new departure have led to further and increased efforts in the same direction. Thus, year by year, the tendency to enrich the resources of *materia medica* by the products of the laboratory have continued to extend, and the stream of these new remedies is now so constant that it is a somewhat difficult matter to keep abreast of it. The tendency referred to has become a fashion, and, being now no longer confined to well-trained investigators and matured chemical thinkers, it almost threatens to become a mania. It is not surprising, therefore, that many of the numerous products so hastily thrown on the market are of a more or less inferior type. There is no lack of productions clearly traceable to scientific work similar to that which gave rise to the introduction of antipyrine, phenacetin, antifebrin, etc.; but there are many others having no claim to be regarded as synthetical remedies in any sense, and consisting merely of mixtures of chemicals or drugs introduced under fanciful and often misleading names. In due time, no doubt, there will be a reaction against an outgrowth of this kind. Meanwhile it appears to us to be our duty, in a book of reference like the present work, to include short notices of most of the recent additions to the list of new remedies, though we may feel convinced that a good many of these will not survive the year of their introduction. Space, however, does not permit us to allude to them individually in this preface.

Commencing our introductory sketch of some of the leading

contents of this volume with a brief survey of contributions to the literature of chemistry, we refer in the first place to some of the recent work in connection with vegetable alkaloids and similar active principles. Much attention has again been given to the further study of cinchona bases, and especially to the subject of quinine testing. For the purpose of ascertaining the purity of the sulphate of this alkaloid, L. de Koningh suggests a modification of De Vrij's chromate process, differing from the original method in providing for the detection of cupreine, which had been ignored in the latter. A new process, recommended by M. Kubli, is based on the observation that, while the sulphates of the inferior cinchona alkaloids are more soluble than the pure quinine salt, the liberated alkaloids behave in an opposite manner. In addition to this so-called "water test," the same author also suggests another method, distinguished as the "carbonic anhydride test," and depending on differences between pure and impure quinine in the precipitation of the base from its solution in sodium bicarbonate by means of carbonic anhydride. O. Hesse and A. Weller, however, find that neither of these two processes is as trustworthy as the official tests, and this opinion is endorsed by D. Howard. The last-named chemist, in reviewing the chief methods of quinine testing, expresses himself in favour of Prunier's modification of the ether test. He regards the ammonia test as one offering great advantages in cases in which proof of the absolute purity of quinine sulphate is required; but he points out at the same time that it is inexpedient to insist upon a degree of purity which can only be attained at a most disproportionate expense without adding to the therapeutic value of the preparation. The same author also makes some interesting observations on the disturbing effect of the presence of free alkaloid or of a small proportion of sodium or potassium sulphate in the quinine salt on the indications of the ammonia test. Another mode of quinine testing is proposed by J. G. Kramers, who avails himself of the complete precipitation of quinine from its solutions by sodium nitroprusside, as a means of separating this base from other cinchona alkaloids, the presence of which can then be recognised in the filtrate. A. J. Cownley again calls attention to the efflorescent nature of ordinary quinine sulphate, and suggests the use of the air-dried salt, containing two molecules of water of crystallisation, as preferable on account of its constancy in composition. Quinine hydrochloro-sulphate, a pharmaceutical preparation used in

France, has been examined by M. Georges, who finds that the chemical, optical and microscopic characters of this substance prove it to be a mere mixture of hydrochlorate and sulphate of quinine. The most interesting of recent reports on cinchona bases appears to us to be a communication from W. Koenigs and A. Husmann, showing that cinchonine can be partially converted into cinchonidine by prolonged heating with an amyl alcohol solution of potash.

The alkaloids of jaborandi have also absorbed a fair amount of attention. B. H. Paul and A. J. Cownley show that different species of *Pilocarpus* vary considerably in the nature and proportion of the alkaloid contained in them, also that the pilocarpine salts of commerce represent variable mixtures of several bases, and that the present state of knowledge respecting the individual alkaloids hitherto obtained from jaborandi is so vague and unsatisfactory as to call for a thorough re-investigation of the chemistry of this drug. P. Knudsen throws doubt on the correctness of the views expressed by Hardy and Calmels with regard to the constitution of pilocarpine and pilocarpidine, and states that he has not been able to effect the synthesis of these bases from pyridine lactic acid on the lines indicated by those chemists. The opinion of the same investigators (Hardy and Calmels) that pilocarpidine is a decomposition product of pilocarpine is disproved by A. Petit and M. Polonovski, who find that these two bases are isomeric, that both pre-exist together in the plant, and that commercial pilocarpine salts are variable mixtures of salts of both alkaloids. They further state that they have isolated from *Pilocarpus spicatus* two new bases distinct from pilocarpine and jaborine.

The dispute between O. Hesse and E. Schmidt with regard to scopalamine continues without any change in the views of either of these investigators. The former still regards commercial scopalamine salts as mixtures of salts of hyoscyne and of his new base, atroscine, while E. Schmidt retains the opinion that atroscine is merely an optically inactive modification of scopalamine, such as is readily formed from the normal base under the influence of alkalies, etc. In other respects the difference between the two authors is more apparent than real, for it will be remembered that Hesse uses the same hyoscyne, not for the supposed isomeride of atropine and hyoscyamine of the formula $C_{17}H_{23}NO_3$, for which it was proposed by Ladenburg, but for an alkaloid identical in every respect with the normal

scopolamine of Schmidt ($C_{17}H_{21}NO_4$). H. A. D. Jowett has examined the base of *Aconitum heterophyllum*, and finds that this substance does not present any close analogy to the alkaloids of other well-known species of aconite. The last report on aconitine, by W. R. Dunstan, T. Tickle and D. H. Jackson, deals with the action of methyl alcohol on this base, and the formation of methyl benzaconine. Solnine, an alkaloid isolated from the root of *Solanum carolinense*, is again reported upon by J. U. Lloyd, and is shown to differ essentially from solanine in its melting point. Morphine and codeine form the subject of a paper by L. Fouquet, in which it is shown that these bases can be readily separated from each other by a process based on the solubility of codeine and the complete insolubility of morphine in anisol. The constitution of caffeine is discussed by E. Fischer, while the estimation of this alkaloid in tea or coffee is dealt with by A. Delacour, M. Georges, and M. L. Q. van Ledden Hulsebosch.

A further investigation of β -digitoxin has satisfied H. Kiliani of the perfect identity of this substance with Schmiedeberg's digitoxin. This principle, which is now shown to have the composition $C_{31}H_{50}O_{10}$, does not appear to occur in foxglove seed. Delicate colour reactions of digitoxin, digitonin, digitalin, and digitalein, the four active constituents of commercial digitalin, are described by C. C. Keller. In using Kiliani's reagent (sulphuric acid containing a ferric salt) for the detection of digitalin, it seems necessary to make certain of the absence of cinchona bark or any of its preparations, since quinotannic acid is now shown by Beisser to give the same reaction as digitalin. The non-identity of gelsemic acid with α -esculin is confirmed by V. Coblentz. Vicin, a constituent of sow-beans and vetches, which has hitherto been regarded as an alkaloid, is now shown by Ritthausen to be a glucoside. The same author has obtained additional evidence of the perfect identity of alloxantin, prepared from convicin, and the oxidation product from uric acid.

The formation of urea by the oxidation of proteids by means of permanganate, which long ago was tried unsuccessfully by Béchamp, has now been accomplished by F. Hofmeister, who has obtained this substance, not merely from albumin, but also from a considerable number of other organic substances, by the use of a large excess of the oxidising agent (permanganate) in the presence of ammonia and ammonium sulphate. The supposition, expressed by G. S. Johnson, that creatinines prepared from different sources may not be perfectly identical bodies, is disproved

by M. Toppelius and H. Pommerehne, who find that there is absolutely no difference between urinary creatinine, the creatinine from flesh, and the synthetic product. The synthesis of uric acid has again engaged the attention of E. Fischer; and it is now shown that mineral acids may advantageously take the place of oxalic acid in the conversion of pseudouric into uric acid. W. T. Laurence has effected a new synthesis of citric acid by the formation of ethyl citrate as a product of the condensation of ethyl bromacetate with ethyl oxalylacetate in presence of zinc. The process appears interesting as being simpler and more direct than the synthesis from sym. dichloroacetone or from ethyl- γ -cyanacetoacetate.

In a report on a new synthesis in the sugar group, H. J. H. Fenton deals with a condensation product of the glycollic aldehyde, obtained from dihydroxymaleic acid and indirectly from tartaric acid. The conditions under which the latter acid is converted into the former by atmospheric oxygen are regarded as establishing close analogies with some of the essential conditions of vegetable growth; and it is suggested that the synthesis of a sugar in the manner here indicated may possibly help to throw some light upon the natural formation of carbohydrates. The products of starch hydrolysis by diastase have received further attention from H. T. Brown, G. H. Morris and J. H. Millar, and also from A. R. Ling and J. L. Baker. The normal occurrence of dextrin (achroo-dextrin) in honey is pointed out by O. Künmann and A. Hilger.

A. Richardson and Emily C. Fortey have examined the action of light on various alcohols in the presence of oxygen, and find that, while methyl, ethyl, propyl, and butyl alcohols undergo no change under these conditions, amyl alcohol gives rise to the formation of hydrogen peroxide and of valerianic acid. The presence of moisture appears to be unnecessary for the production of hydrogen peroxide in this oxidation. The action of light on ether in presence of oxygen has been studied by the same authors, with the result of showing that the formation of hydrogen peroxide in this instance is accompanied by that of aldehyde and acetic acid. Here, too, it is found that distinct indications of the peroxide are obtained even in the entire absence of moisture; and both in this case and in that of amyl alcohol, the oxidation products appear to differ from those obtained by the action of ordinary oxidising agents merely in the formation of hydrogen peroxide in the place of water. The purity of chloroform forms the subject of papers

by Béhal and François and by M. F. Gay. M. Delépine discusses the action of water on formaldehyde and infers from his results that this aldehyde, as the first assimilation product of carbon in chlorophyll-containing plants, may account for the occurrence in these of methyl alcohol, formic acid and similar substances. Formaldehyde is rapidly gaining in favour as a preserving agent, general antiseptic, etc. Its various applications are dealt with in a paper published by F. C. J. Bird.

The results of an investigation of products obtained in the destructive distillation of linseed oil, by S. P. Sadtler, reveal the interesting fact that these products contain hydrocarbon oils analogous to the natural mineral oils. It is inferred from this observation that it might be justifiable to widen Engler's theory so as to include vegetable seed oils as probable additional sources of the formation of petroleum deposits.

V. Meyer and M. v. Recklinghausen call attention to the observation that acidified solutions of potassium permanganate evolve considerable quantities of oxygen, when agitated with hydrogen or carbonic oxide. The nature or cause of this peculiar action of the reducing agents named is still under investigation. Meanwhile, an explanation is suggested by H. N. Morse, who is inclined to attribute this decomposition of permanganic acid to the action of small quantities of manganese dioxide formed in the first stage of the reaction. He refers to experiments, carried out by Hopkins, Walker, and himself, as illustrating this effect of manganese dioxide, and further states that the well-known instability of permanganate solutions is mainly due to the action of traces of this oxide, and can therefore be prevented by filtration. The reaction between hydrogen peroxide and silver oxide, which used to be represented by the equation: $\text{H}_2\text{O}_2 + \text{Ag}_2\text{O} = \text{Ag}_2 + \text{H}_2\text{O} + \text{O}_2$, until Berthelot substituted for this: $2\text{H}_2\text{O}_2 + 4\text{Ag}_2\text{O} = 2\text{H}_2\text{O} + 2\text{Ag}_3 + 2\text{Ag}_2\text{O} + 2\text{O}_2$, is now found by E. Riegler to occur in accordance with the equations: $3\text{H}_2\text{O}_2 + 2\text{Ag}_2\text{O} = 3\text{H}_2\text{O} + \text{Ag}_4\text{O} + 2\text{O}_2$, and $\text{Ag}_4\text{O} = \text{Ag}_2 + \text{Ag}_2\text{O}$. C. Engler and W. Wild have observed that hydrogen peroxide is completely decomposed when its vapour is brought in contact with chromic acid, while ozone is not acted upon by this oxidising agent. The separation of hydrogen peroxide from ozone, which thus becomes practicable, seems likely to remove the difficulty hitherto experienced in positively proving the presence or absence of the latter in the air. The direct union of carbon and hydrogen has been further studied by W. A. Bone and D. S. Jordan, who have obtained, in addition

to acetylene and other unsaturated hydrocarbons, appreciable quantities of menthane. A simple mode of converting alkaline nitrites into cyanides has been effected by W. Kerp, by fusing sodium or potassium nitrite with sodium acetate, the products being cyanide, bicarbonate and water. Conflicting opinions, with regard to the constitution of the so-called nitrogen iodide, are expressed by F. D. Chattaway and J. W. Mallet. Red phosphorus is shown by H. Aretowski to be capable of volatilizing and forming a crystalline carmine-red sublimate, when heated at 100° C. in a vacuum for a long time. A new element, "philippium," is described by M. Delafontaine, and stated to be closely related to cerium and terbium. P. Barrière's alleged new element, "lucium," on the other hand, is found by W. Crookes to consist of impure yttrium. W. Ramsay and J. N. Collie have diffused argon as well as helium through layers of pipe clay, and have examined the individual fractions of each obtained in this manner. These, in the case of argon, appear to exhibit no differences; while helium has yielded fractions differing appreciably in density and refracting power, but not at all in their spectra. These results, however, are not regarded as a proof of the non-elementary character of this gas.

Argon and nitrogen are shown by P. Regnard and T. Schloesing to occur in blood in greater proportion than can be accounted for on the assumption of a simple dissolution from the air. It is suggested that the membrane separating the blood from the air in the lungs may be the active agent in causing the dissolution of abnormal quantities of the gases. A new blood-constituent of the composition $C_{20}H_{31}OH$, described by K. Hürthle under the name "hæmosterol," appears to be allied to cholesterol. "Lipase," an active enzyme possessing in a marked degree the power of hydrolysing monobutyrin, has been isolated from blood by M. Hanriot. It proves to be identical with a vegetable enzyme subsequently detected by E. Gérard in *Penicillium glaucum*. Both in animals and plants it appears to serve for the utilization of reserve fat.

Experiments described by E. Buchner on the action of brewers' yeast on sugar solutions furnish strong evidence in support of the conclusion that ordinary alcoholic fermentation is not directly due to the development of the living yeast cells, but to the action of a soluble enzyme or ferment generated by these cells. A carefully filtered solution of this "zymase," quite free from yeast cells, readily induces alcoholic fermentation in solutions of cane-sugar,

maltose, glucose, or fructose; and it would thus appear that, in harmony with Liebig's views, and in opposition to those of Pasteur, all the various stages of the conversion of starch into the final products, alcohol and carbonic acid, result from the purely chemical action of enzymes, and not directly from biological or physiological processes. The living plant produces the enzyme, but the latter causes the fermentation.

P. Cazeneuve describes a new oxidising ferment isolated by him from red wines, which possesses the power of oxidising and precipitating the natural colouring matter, and thus accounts for the well-known "breaking" of such wines on exposure to air. The oxidising action of tyrosinase, a ferment reported upon some time ago (*Year Book*, 1896, 63), is found by M. Bourquelot to be most marked with phenols and substances possessing a phenolic function. The red coloration produced in guaiacol by the addition of gum arabic appears to be due to a similar oxidising ferment contained in the gum.

Since it has become known by researches on the thyroid gland that iodine is a normal constituent of the human and animal organism, no surprise will be caused by W. Rosenthal's observation that the administration of bromides is not followed by their complete elimination, but that minute traces are retained and stored up in various organs. The question has often been discussed whether or not the presence of copper in articles of food is injurious to health. This metal is now shown by K. B. Lehmann to occur normally in a much greater variety of articles of ordinary diet than has hitherto been supposed. He considers that the average daily consumption of copper by an adult amounts to about 20 milligrammes, but that this proportion may rise to as much as 300 milligrammes through the consumption of preserved vegetables. Quantities exceeding 120 milligrammes per day appear to be harmful. The injurious effects of arsenical wall-papers have generally been attributed partly to the direct action of the pigment, detaching itself from the paper in the form of dust, and partly to the development of arseniuretted hydrogen or of other gaseous arsenic compounds, though the cause of the formation of the latter has never been demonstrated. B. Gossio now finds that *Penicillium brevicaulis* and several other micro-organisms possess the power of developing highly toxic gases from solid arsenic compounds.

The close relation between urobilin and the yellow pigment of urine, to which attention had already been directed by Riva and

Chiodera, is further illustrated by A. E. Garrod's observation that the latter pigment can be converted into the former by the action of aldehyde. Methods for the extraction of urobilin are described by the same author and F. G. Hopkins, who point out that the pure pigment, no matter whether prepared from normal or pathological urine, or from fæces or bile, always possesses exactly the same chemical and spectroscopic characters. In another report on the extraction of colouring matters from urine, W. Kramm advocates the use of phenol as a very suitable solvent for urobilin and urochrome. A proteïd, apparently identical with Lilienfeld's nucleohiston, has been observed to occur in the urine of leucæmic patients by A. Jolles, and also by R. Kolisch and R. Burian.

G. Dragendorff has published another contribution to forensic chemistry, in which the isolation and identification of a large number of active plant constituents, as well as of many synthetic remedies, is discussed. J. B. Naglevoort confirms Kobert's statement that morphine is not readily destroyed by the decomposition of animal organic matters, and that its presence in such substances can be established in cases of poisoning, even after putrefaction has proceeded for several months. The same observation, with regard to strychnine, is corroborated by C. Spaeth. In a paper on the detection of hydrocyanic acid in toxicological investigations, stress is laid by F. Filsinger on the great superiority, in point of sensitiveness, of the guaiacum copper reaction over the more usual tests for this acid. For the forensic detection and estimation of free hydrochloric acid, M. Gaultier proposes a process based on the conversion of the acid into lithium chloride, and the extraction of the latter by a mixture of anhydrous ether and absolute alcohol. The detection of mercury in forensic analyses forms the subject of a report by D. Vitali.

For the purpose of detecting traces of lead or copper in potable waters, C. G. Egeling suggests that the acidified sample, treated with sulphuretted hydrogen, should be shaken with a heavy insoluble powder, such as talc, which in settling will carry down with it even such minute traces of lead sulphide or copper sulphide as might otherwise escape precipitation or observation. Their presence may then be readily ascertained in the sediment by the usual methods of analysis. The same idea underlies a process for the quantitative determination of lead in water, proposed by U. Antony and T. Benelli. In this case, mercuric chloride is recommended to be added to the sample in sufficient quantity to produce an appreciable precipitate with sulphuretted hydrogen ;

and this precipitate, after filtration and washing, is then strongly heated with excess of air, and the residue treated with sulphuric acid, and weighed as lead sulphate. A volumetric process for the estimation of arsenic, suggested by E. Szarvazy, consists in the combustion of the sulphide in a current of oxygen, and the iodometric titration of the resulting trioxide. L. L. de Koninck and E. Prost have critically examined the ferrocyanide method of estimating zinc, and find that, though the direct titration is very unsatisfactory, trustworthy results may be obtained by adding a measured excess of ferrocyanide to the zinc solution, and subsequently titrating the excess of the reagent with a hydrochloric acid solution of zinc of known strength. P. Sabatier directs attention to the intense purple or blue coloration which is developed in sulphuric acid containing nitrous acid on the addition of cuprous oxide or a cuprous salt, and shows that this reaction, which may serve as a test for nitrites, is due to the formation of the copper salt of an acid of the formula $\text{NO}(\text{SO}_3\text{H})_2$. The colour reaction of nitrous acid with brucine forms the basis of a test for nitrites proposed by P. Pickard. The results of alkalimetric studies by F. W. Küster seem to justify the conclusion that the volumetric estimation of alkaline hydrates and carbonates in mixtures of both cannot be carried out with accuracy by direct titration with the aid of different indicators, and that the only method which can be relied on to give trustworthy results is that published by C. Winkler. A new reagent for alkaloids, introduced by A. Jaworowsky, consists of an acetic acid solution of sodium vanadate, to which a small quantity of copper sulphate has been added. The same author also recommends a solution of sodium hyposulphite and copper sulphate as a new reagent for cinchona bases. C. Caspari has observed that the presence of commercial alcohol in solutions of alkaloids may seriously impair the accuracy of volumetric estimations of these substances. This statement is confirmed by F. Kebler, who shows that the disturbing effect referred to is chiefly due to impurities contained in the alcohol. A comparison of various tests for the detection of acetanilid in some closely related synthetic remedies, leads F. X. Moerck to infer that the iso-nitrile reaction affords the best means for the recognition of this substance in such cases. The blue colour developed when milk containing formaldehyde is added to strong sulphuric acid is now shown by O. Hehner, the discoverer of this delicate test, to be due to the presence of casein. In order to detect formaldehyde by this test in other liquids, such as wine or vinegar, it is therefore

recommended to mix the sample with a drop of milk before adding it to the acid. Various other colour reactions, serving for the detection of the same preserving agent in milk, are described by Denigès and Lebbin. The addition of boric acid to milk is shown by E. H. Farrington to give rise to a strong acid reaction, greatly exceeding that of an aqueous solution of the same quantity of this acid. A method for the separation of calcium from barium and strontium, proposed by S. G. Rawson, is based on the insolubility of calcium nitrate and the ready solubility of barium and strontium nitrates in strong nitric acid. Dealing with barium estimations, C. W. Foulk points out that in order to ensure complete precipitation, especially in the presence of much hydrochloric acid, a large excess of sulphuric acid is required, which, moreover, has the advantage of yielding the precipitate in a coarse crystalline condition, in which it is not liable to run through the filter. H. Neubauer directs attention to the necessity of certain precautions in the estimation of magnesium as pyrophosphate, in order to guard against erroneous results due to a want of constancy in the composition of the precipitated ammonio-magnesium phosphate. Various suggestions are made by C. Fabre and E. Bauer for accelerating the process for the estimation of potassium as platino-chloride.

We must abstain from alluding to numerous other analytical processes noticed in this volume, and pass on to a summary of some of the recent contributions to the literature of materia medica and pharmacy.

Of the vegetable remedies discussed during the past year, many have met with previous notices, and are now re-introduced in a new capacity. The greater celandine, *Chelidonium majus*, is reported upon by M. Denissenko, who claims to have obtained very encouraging success with the extract and juice of this plant in the treatment of cancer. Both these preparations are employed by him internally, as well as in the form of subcutaneous injections applied direct to the tumour. Linseed, administered as an infusion or tea, is strongly recommended by W. W. Vogel for the treatment of diabetes, in which it is stated to cause a most marked and rapid diminution in the excretion of sugar. S. D. Bullington reports very favourably on the value of a fluid extract of the passion-flower, *Passiflora incarnata*, in epilepsy, hysteria, neurasthenia, insomnia, and other nervous ailments. The flowers of *Reseda odorata*, given in the form of a strong decoction, are found to be an efficient tænicide. The anti-malarial properties of the sunflower,

Helianthus annuus, are discussed by M. Moncorvo, who has employed an alcoholic extract of the flowers with much success as a substitute for quinine. A favourable account is given by A. Hewelke of the value of the root of *Actæa racemosa* (*Cimicifuga racemosa*) in acute rheumatism. The leaves of the birch, *Betula alba*, are recommended by Winternitz as an excellent and perfectly harmless diuretic; and similar properties are ascribed to various Chilian species of *Acena*. The Canada thistle, *Cnicus arvensis*, is stated to act as a tonic, in larger doses as a diaphoretic, and in very large doses as an emetic. It is shown by H. J. Pearce to contain a volatile alkaloid. *Senecio vulgaris* and *S. jacobea*, administered in the form of partly aqueous and partly alcoholic extracts, are recommended by several investigators as efficient emmenagogues. The root of *Balsamorhiza terebinthacea* is reported upon by L. E. Sayre as a most valuable remedy in cases of cardiac disturbance, and also as a cure for the habit of excessive tobacco smoking. The juice of *Commelina tuberosa*, a Mexican plant, is stated to possess marked hæmostatic properties, which A. Herrera attributes to the proteid principle contained in it. The value of a fluid extract of horse-chestnut (*Æsculus hippocastanum*) as an internal remedy for allaying pain in hæmorrhoids is confirmed by M. Artault. A Chilian drug, consisting of the sliced root of *Gunnera chilensis*, is referred to as an astringent, containing a large proportion of tannin. Species of *Monsonia* are stated by J. Maberly to be used in South Africa with considerable success in dysentery. *Fumaria parviflora*, which is known to possess laxative and diuretic properties, is now recommended as a valuable remedy in the treatment of leprosy and eczema; and a fluid extract of *Rhinacanthus communis* is mentioned as a useful external application for various other skin diseases.

G. Klemperer confirms the value of urea as a diuretic and solvent of uric acid, and has also used it with success in pleuritic exudations as well as in cirrhosis of the liver. Further evidence as to the efficiency of piperazine and lysidine in uric acid diathesis is supplied by W. Goodbody. Barsky reports upon the merits of pilocarpine hydrochloride as a remedy in diphtheria, and ascribes its curative effects to the more rapid elimination of the toxin caused by the salivation and diaphoresis induced by this alkaloid. Atropine, also, appears to be useful in diphtheria; and resorcin, applied in the form of a mouth-wash, is found to act as a prophylactic against the same disease. Duboisine sulphate is stated by Croidal and Gianelli to possess the power of diminish-

ing the number and intensity of epileptic attacks. Morphine is credited by Heim with the power of counteracting the toxic effects of potassium cyanide. Scopolamine, hypodermically injected, has proved useful as a cerebral sedative in certain mental disturbances. Quinine is recommended in whooping-cough; paraldehyde in asthma; sodium chlorate as a palliative in uterine cancer; arsenic as a very efficient prophylactic against scarlet fever; uranium salts in diabetes; cerium salts as antiseptics and active germicides; sodium hyposulphite as a local application in diphtheria; and potassium permanganate in pruritus and other skin diseases.

In a paper on "trees yielding myrrh," E. M. Holmes arrives at the conclusion that Arabian myrrh, contrary to the opinion recently expressed by Schweinfurth, is probably the produce of *Commiphora myrrha* (*Balsamodendron myrrha*, Nees). The same author gives an account of attempts to cultivate the sumbul plant in England. This subject is evidently one requiring attention, since genuine sumbul root seems to have entirely disappeared from the markets, its place having been taken by an inferior drug derived from a different plant. A new kino, described by E. Schaer as the juice from the bark of several Asiatic species of *Myristica*, appears to agree in all important points with the official Malabar drug from *Pterocarpus marsupium*. Thus another illustration is afforded of the fact that plants of entirely different natural orders may yield almost identical products. Indian podophyllum, the produce of *Podophyllum emodi*, is found by W. R. Dunstan to contain about $2\frac{1}{2}$ times as much resin as the American drug. Its resin is stated by H. W. G. Mackenzie to be equal in its medicinal action to that obtained from the official rhizome. H. J. Lohman advocates the proper seasoning of podophyllum before its use in pharmacy, on account of the comparative inactivity of the fresh rhizome and the rather slow development of its active ingredient. With regard to the podophyllin of commerce, he calls attention to the therapeutic inferiority of the greenish-yellow product obtained by precipitation in the presence of alum. The results of an examination of commercial varieties of ginger, by W. S. Glass, appear to indicate that African ginger, though very inferior in appearance to the Jamaica and Cochin drugs, contains the largest proportion of oleo-resin, and yields the strongest essence. The commercial varieties of fennel have been investigated by J. C. Umney, who arrives at the conclusion that the Russian, Roumanian, Galician, Japanese, and Saxon

varieties of this drug are best adapted for use in pharmacy. Of these, he seems inclined to prefer the Saxon fruits. Swedish ergot, like the Norwegian drug, is found by C. C. Keller to be remarkably poor in cornutine, compared with the Russian and Austrian varieties.

L. E. Sayre furnishes a structural description of the root, rhizome and stem of gelsemium, as well as an account on the results of an analysis of the same. The same author reports upon structural differences between Alexandrian and Indian senna, which may serve for the recognition of the powdered drugs and their differentiation in mixtures of the two. A comparative study of true or Banda mace (*Myristica fragrans*), and Bombay mace (*M. malabarica*), has established histological differences such as will render it easy to recognise mixtures of the powdered drug by the aid of the microscope. A. H. Hills deals with differences in structure between the woods of Jamaica quassia (*Picræna excelsa*) and Surinam quassia (*Quassia amara*). The structure of the rhizome and roots of *Veronica virginica* is described by A. P. Breithaupt, and that of various parts of *Solanum carolinense* by C. G. Johnson and M. C. Thrush.

A considerable number of plants and drugs have been investigated with reference to their constituents. *Urtica urens* and *U. dioica* have been examined by E. Giustiniani with the object of throwing light on the nature of the principle to which these nettles owe their hæmostatic action. His analyses show the presence of formic acid and of nitrates, and the absence of alkaloïds; and it is conjectured that these plants contain a glucoside, which readily undergoes hydrolytic decomposition with the formation of one or more volatile acids. The flowers of *Datura alba* have been analysed by F. Browne, whose results indicate that this plant owes its anodyne and toxic properties to hyosine, which appears to occur in it unaccompanied by any other alkaloid. Some new constituents have been isolated from the leaves of *Carica papaya* by van Rijn, who also supplies further information respecting the alkaloid carpaine, which appears to combine a strong cardiac action with antipyretic properties surpassing those of quinine. The leaves of the bitter orange, *Citrus vulgaris*, are found by E. Jahns to contain stachydrine, a base obtained by von Planta and Schulze from *Stachys tuberifera*. *Adonis æstivalis* has yielded to N. Kromer a new bitter glucoside, resembling adonidin (from *Adonis vernalis*) in its physiological action. A crystalline glucoside, similar to digitalin, strophanthin and ouabain in its

action on the heart, has been obtained by Lehmann from *Periploca græca*. The bark of *Lunasia amara*, which is used by the natives of the Philippine Islands for the preparation of an arrow poison, is shown by P. C. Plugge to contain a poisonous glucoside resembling digitalin in its cardiac action. The sap of the upas tree, *Antiaris toxicaria*, which likewise is employed as an arrow poison, is found by H. Kiliani to contain a toxic glucoside of the composition $C_{27}H_{42}O_{10}$, in addition to two other crystallisable constituents. We may here remark that a South American arrow poison, obtained from the larvæ of a *Diaphidia*, is reported by R. Boehm to owe its poisonous action to a toxalbumin. The leaves of *Palicourea rigida*, a poisonous Brazilian drug known to possess diuretic and diaphoretic properties, have been re-examined by C. G. Santesson, who confirms Peckolt's statement as to the presence of an alkaloid, but shows at the same time that the extract, from which the base has been removed, still retains a marked toxic action. *Parthenium hysterophorus* has been subjected to an analysis by H. V. Arny, whose results indicate the presence of a neutral principle analogous to santonin, and throw doubt on the existence of the alkaloid "parthenine," described by Tovar. *Plumiera acutifolia* is reported by E. Merck to contain a new crystalline bitter principle ($C_{57}H_{72}O_{33}$), the exact nature of which remains yet to be ascertained. The same author has also isolated a new crystalline constituent from the root of *Imperatoria ostruthium*. *Andropogon sorghum*, an Indian fodder plant, is proved to owe its poisonous action to potassium nitrate occurring in the stem in enormous proportions. A drug known as "Culli colorado," consisting of different parts of *Oxalis rosea*, has been examined by K. Peinemann, and is found to contain as much as 11.8 per cent. of oxalic acid, calculated on the dry drug. The fresh stems are stated to contain about 3.25 per cent. of this constituent in the form of acid oxalates. It would be interesting to compare these numbers with the proportions of oxalic acid occurring in English species of *Oxalis*, but nothing appears to be known respecting its amount in the latter. The cantharidin-like effects of acajou balsam are attributed by L. Spiegel and C. Dobrin to a substance soluble in ether, rather than to cardol; a chemical investigation of cardol, $C_{32}H_{50}O_3$, proves that this body is not in any way related to cantharidin. Maturin copaiba, a variety of this oleo-resin not often met with in commerce, is found by F. Dietze to have practically the same composition as the Marauham drug, and to respond to all official requirements.

Specimens of Jeypore opium, examined by W. R. Dunstan, show a poor yield of morphine and a comparatively high percentage of narcotine. Guaiacum resin has been investigated by O. G. Doebner and E. Lückner, who find that two of its principal constituents, guaiaretic and guaiaconic acids, are isomeric with resinous products obtained synthetically from tiglic aldehyde. An analysis of gamboge by M. Sassarini reveals, in addition to the known constituents of this gum resin, the presence of a volatile oil which has not hitherto been noticed in investigations of this drug. With regard to official tests for the purity of gamboge, E. G. Eberhardt considers it desirable to require that not less than 75 per cent. of its weight should be soluble in alcohol, and that the tests for starch should be such as to distinguish between mere traces (which never seem to be absent in the powder) and a decidedly fraudulent admixture.

Some of the recent contributions to the literature of drug adulteration may be briefly referred to in this place. A new adulterant or substitute of Maranham jaborandi is reported on by E. M. Holmes, and shown to be the produce of a hitherto undescribed species of *Swartzia*, for which he provisionally suggests the name *S. decipiens*. The differential characters in the structure of true jaborandi and of its chief adulterants form the subject of a paper by A. Schneider, dealing with the examination of the powdered drug. The adulteration of the rhizome of *Hydrastis canadensis* with serpentary, to which attention was called a few years ago, has again been observed in a recent sample. E. M. Holmes describes an adulterant of blood root (*Sanguinaria canadensis*), consisting of the rhizome of *Chamaelirium carolinianum*, which is shown to differ from the genuine drug by its greyish, perforated surface, and the presence of a well-defined central column in the transverse section. This appears to be one of the rare cases of admixture in which the spurious constituent commands a higher price than the pure drug. The pharmaceutical and chemical characteristics of cubeb and their adulterants are discussed in a lengthy report by K. Peinemann. A false kola is referred to by T. H. Wardleworth, and also by another observer, who considers it to be the produce of a species of *Dimorphandra*. Some bales of aniseed examined at Rotterdam have been found to contain an admixture of 10 per cent. of hemlock fruits. P. Siedler refers to the adulteration of strophanthus seeds with the seeds of *Kickxia africana*, and the distinguishing characters of these drugs. G. R. Durrant reviews the literature of insect powder and its adulter-

ants, and describes a process for the testing of this drug. He considers the value of this article to be proportional to the combined amount of essential oil and soft acid resin contained in it, and inversely proportional to the amount of chlorophyll—both statements to be read in conjunction. L. F. Kebler and C. H. La Wall direct attention to the occasional presence of starch and of strontium sulphate in opium, and regard the latter, but not the former, in the light of an adulterant. H. Trimble, however, thinks it quite possible that this sulphate may be a natural constituent, since strontium salts have been repeatedly observed in the ash of plants. A sophisticated sample of scammony is reported upon by J. W. Thomson, and a fictitious balsam of tolu by J. O. Braithwaite. Directions for the detection of common resin in balsam of tolu and in guaiacum are given by E. Hirschsohn. The same author also deals with the various tests for the purity of copaiba, and shows that, while there is no difficulty in detecting an adulteration with fixed oils or with gurgjun oil, a trustworthy test for the recognition of an admixture with common resin is still a desideratum. M. Conroy refers to the fact that a large number of sophisticated samples of copaiba are now occurring in the market, and points out that, whereas in those imported from copaiba-producing districts, the adulteration is chiefly confined to an admixture of fatty oils, others imported from the Continent are often more or less entirely factitious, being chiefly composed of common resin and oil of turpentine, or of mixtures of such products with copaiba. It also appears from his observations that gurgjun oil is not now much used as an adulterant of this drug. The extensive adulteration of civet is shown by a recent examination of commercial specimens by J. O. Braithwaite. Water, fatty and saccharine matters appear to be the chief adulterants. Cinnabar has been observed as an adulterant of musk by J. T. Hornblower; and the Röntgen rays have enabled M. Wolff to recognise the presence of lead in the interior of an unopened musk-sac. M. Cabannes calls attention to the not infrequent occurrence in cantharides of other beetles, containing less cantharidin or none whatever. Tests for the detection of an adulteration of spermaceti with stearin are described by E. Hirschsohn, while the characters of pure spermaceti form the subject of a further report by L. F. Kebler.

In a report on the assay of opium and its preparations, E. H. Farr and R. Wright uphold the much criticised process of the B.P., showing that if certain precautions are observed, it is equal to the best of published methods. Among these precautions we may

here mention the drying of the isolated alkaloid at a somewhat higher temperature than that of boiling water, a suggestion which has also been urged by D. B. Dott. G. Loeff describes an expeditious method of opium assay, the chief feature of which consists in the removal of resinous matters from the extract by means of sodium salicylate before the precipitation of the morphine. Another new method for assaying this drug is described by A. Grandval and H. Lajoux. J. W. T. Knox and A. B. Prescott deal with the assay of kola nut by a new process intended to eliminate the main sources of error inherent in the methods hitherto in use for this purpose. Improved processes for the assay of coca leaves and of fluid extract of coca are proposed by A. R. L. Dohme and L. F. Kebler, and likewise by A. Gunn. T. Schäfer suggests a new method for the assay of aloes, while P. Apéry discusses the detection of this drug. A very promising process for the alkaloid-assay of extracts, described by C. Kippenberger, consists in the precipitation of the alkaloids as iodine compounds, the purification of an acetone solution of the precipitate by means of petroleum ether, the subsequent removal of the acetone, the successive treatment of the resulting solution with sodium hyposulphite and sodium carbonate, and the final extraction of the liberated alkaloid with a suitable solvent. The alkaloids are thus obtained in a very pure condition. The constituents of ethereal extract of male-fern have been reinvestigated by R. Boehm and F. Kraft, the former of whom describes four new substances isolated by him, while the latter deals chiefly with the determination of the percentage of filicic acid. The occasional presence of caramel in commercial fluid extracts, as well as the detection of this admixture, is referred to by Haussmann. Under the name "*Rhamnus saccharatus*," a preparation is introduced by J. E. de Vrij, consisting of a mixture of sugar of milk and solid extract of cascara of definite strength. For the preparation of a bitterless fluid extract of cascara, E. Urban uses freshly prepared lime-milk in preference to the calcined magnesia usually employed. Directions for the preparation of a stable standardised fluid extract of ergot are given by Vosswinkel. Belladonna preparations are stated by A. Kremel to suffer a slow but continuous diminution in their alkaloid strength on keeping.

J. P. Remington has investigated the question, whether or not acetic acid may advantageously replace alcohol as a menstruum for the extraction of drugs like nux vomica. His results lead to an affirmative conclusion. In a paper on colchicum wine, R. C. Cowley reports that an acetic extract of colchicum does not give

an appreciably better product than is obtained by the official process. The results of experiments by H. Bridges, respecting the preparation of acid infusion of cinchona, show that a very satisfactory product is obtained by using the drug in No. 20 powder and infusing for one hour. Owing to great variations in the strength of commercial samples of tincture of strophanthus, J. Barclay discusses the question of the standardisation of this tincture, and suggests for this purpose a mode of assay based on the estimation of the strophanthidin produced by the hydrolytic decomposition of the impure strophanthin. We may here remark that among other proposals for the standardisation of drugs or pharmaceutical preparations, there is one by Dietze for the fixing of a definite proportion of hydrocyanic acid in essential oil of bitter almonds.

A new dialytic process for the preparation of pepsin is described by C. A. Pekelharing, and is stated to yield a most highly active product, which the author is inclined to regard as a pure principle.

In conclusion, we may mention that the absence of any reference in these pages to papers read at the Glasgow meeting of the Conference is due to the fact that this Introduction was written and delivered to the printers prior to the meeting.

CHEMISTRY.

YEAR-BOOK OF PHARMACY.

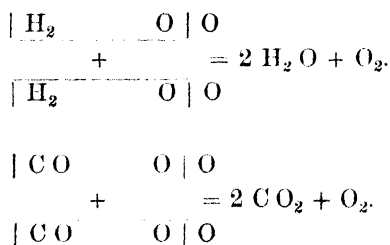
PART I.

CHEMISTRY.

Slow Oxidation of Hydrogen and of Carbonic Oxide by means of Potassium Permanganate. V. Meyer and M. v. Recklinghausen (*Ber. der deutsch. chem. Ges.*, 1896, 2549-2560); also V. Meyer and H. Hirtz (*ibid.*, 2828-2831). Either hydrogen or carbonic oxide, when left in a state of rest over a neutral or alkaline solution of potassium permanganate, undergoes slow oxidation; the gas gradually decreases in volume until it has entirely disappeared. The reaction is accompanied by the separation of brown flakes of manganese oxides. Vigorous and continuous agitation accelerates the process without affecting its nature; but if in this case an acid instead of a neutral or alkaline solution of permanganate be employed, the disappearance of the hydrogen or carbonic oxide is associated with the liberation of oxygen, so that at the end of the reaction a considerable volume of gas is left over the surface of the liquid. Under these conditions, 20 c.c. of a 5 per cent. solution of permanganate acidified with 0.5 c.c. of concentrated sulphuric acid, when shaken with 40 c.c. of hydrogen for a number of hours, were found to yield about 20 c.c. of oxygen; whereas in the absence of hydrogen or carbonic oxide (using air or carbonic anhydride in their place) the oxygen liberated from the acidified permanganate solution under exactly the same circumstances amounted to only about 2.5 c.c. The evolution of oxygen appears to proceed somewhat irregularly, and to vary with the temperature and other conditions of the experiment. The numbers referred to are therefore merely approximate. The amount of oxygen evolved does not increase

after a certain limit has been reached, practically the same volume being obtained on shaking the mixtures for periods varying from 6 to 87 hours. On the other hand, the evolution of oxygen occurring in the acidified permanganate solution, while in a state of rest and without the intervention of hydrogen or carbonic oxide, does not reach its limit in the same manner, but continues unchecked for many weeks, until at length the volume of oxygen liberated amounts to many times that obtained on shaking. The reaction in this case seems to be very much accelerated by heat.

The authors have endeavoured to throw light on the nature of the reaction brought about by the hydrogen or carbonic oxide in their experiments, and are still engaged in this investigation. Thus far they seem to have satisfied themselves that the greatly increased evolution of oxygen caused by these gases is not due to an intermediate formation of ozone or of hydrogen peroxide, nor to a reducing action on the permanganate by any finely divided manganese dioxide produced in the reaction. For the present they appear inclined to regard van't Hoff's explanation of the simultaneous oxidation of triethylphosphine and indigo solution as perhaps throwing some light on their own observations. The view, that in slow oxidations the oxygen molecule acts as two distinct atoms (?) or ions (?), would then explain their reactions as occurring in accordance with the following equations:—



These equations, which are merely offered by the authors as a possible explanation, agree better with the quantitative results obtained in the case of hydrogen than with those obtained with carbonic oxide.

Reduction of Permanganic Acid by Manganese Dioxide. H. N. Morse. (*Ber. der deutsch. chem. Ges.*, 1897, 48-50.) V. Meyer and M. v. Recklinghausen have called attention to the considerable increase in the evolution of oxygen from acidified permanganate solutions under the influence of hydrogen or carbonic oxide (pre-

ceding abstract). The author of the present paper is of opinion that this reaction is brought about by the presence of manganese dioxide, and points out that an exceedingly small quantity of this oxide is sufficient to start the reaction, which then proceeds until three-fifths of the active oxygen contained in the permanganic acid have been liberated. The action of manganese dioxide on permanganic acid has been investigated during the last few years by the author, in conjunction with A. J. Hopkins and M. S. Walker; and the results have been published in the *American Chemical Journal*, 1896, 401-419. These results are summarised in the present paper as follows:—

1. Solutions of permanganic acid or of potassium permanganate are reduced by precipitated manganese dioxide with evolution of three-fifths of the active oxygen contained in the acid.

2. This reduction is the cause of the well-known instability of standardized solutions of permanganate. Such solutions should, therefore, be carefully filtered through asbestos, and then kept in bottles with well-fitting stoppers.

3. Permanganate solutions, which are free from suspended oxide, possess a high degree of stability, even if kept exposed to diffused daylight. In direct sunlight, however, they suffer decomposition.

4. The oxide resulting from the complete reduction of a neutral potassium permanganate solution contains the whole of the potassium of the original salt, and the supernatant liquid is therefore neutral.

5. No matter whether the precipitated manganese dioxide is formed by the slow decomposition of a neutral permanganate solution or by the addition of manganese sulphate to an acidified solution of permanganic acid, the ratio of oxygen to manganese therein remains normal (2 : 1) only so long as unreduced permanganate or permanganic acid is still present. In the absence of permanganic acid or its salts, the oxide loses oxygen even at an ordinary temperature. The oxygen thus lost is restored by permanganate or permanganic acid.

Density of Hydrogen and Oxygen. J. Thomsen. (*Zeitschr. für anorg. Chem.*, xii. 1-15.) The author's results, calculated for 0° C. and 760 mm. pressure at 45° latitude, are as follows:—

The weights of 1 litre of hydrogen and of 1 litre of oxygen are 0.089947 and 1.42906 grammes respectively.

The volume of 1 gramme of hydrogen is 11.1176, and that of 1 gramme of oxygen 0.69976 litres.

The ratio of the densities of the two gases is 1 : 15·8878; that of their atomic weights 1 : 15·8690; and the ratio of volumes in the formation of water 1 : 2·00237.

Density of Hydrogen and Oxygen and the Atomic Weight of Oxygen. E. W. Morley. (*Zeitschr. physikal. Chem.*, xx. 68-130, 242-271, and 417-455.) The mean values obtained in the author's series of determinations are as follows:—

Weight of 1 litre of hydrogen = 0·089873 gramme.

Weight of 1 litre of oxygen = 1·42900 gramme.

Atomic weight of oxygen = 15·879.

Ratio of volumes of the two gases in the formation of water = 1 : 2·00269.

Full details of the apparatus and manipulations are given in the papers.

Phosphorescence of Solutions of Ozone. M. Otto. (*Comptes Rendus*, 1896, 1005-1007.) The author has found that the temporary luminosity imparted to water by ozonised oxygen is due to the action of the ozone on the organic impurities of vegetable or animal origin contained in the water.

Observations on Ozone. C. Engler and W. Wild. (*Ber. der deutsch. chem. Ges.*, 1896, No. 12, 1929-1940.) The authors criticise the various hypotheses advanced to account for the production of a mist or fog when ozone acts on a reducing agent in the presence of moisture. Their own experiments lead to the conclusion that this formation of mist depends on the presence of a gaseous or readily volatilizable substance, capable of yielding a solid or hygroscopic oxidation product. The liberation of iodine by ozone and its oxidation to iodic acid, as well as the oxidation of sulphurous to sulphuric acid and that of ammonia to ammonium nitrate, are given as illustrative instances. Solutions of sulphuretted hydrogen appear to owe their mist-producing character to the liberation of sulphur. Numerous experimental data in support of these conclusions will be found in the original paper.

Separation of Ozone from Hydrogen Peroxide, and Detection of Ozone in the Atmosphere. C. Engler and W. Wild. (*Ber. der deutsch. chem. Ges.*, 1896, No. 12, 1940-1942.) The authors' method for separating ozone from hydrogen peroxide is based on the observation that chromic acid, either in the solid state or in concentrated solution, readily decomposes the vapour of the latter without producing any action on the former. They are at present engaged in experiments, having for their object the detection of

ozone in the air after previous destruction of any hydrogen peroxide by the agent named.

Liquefaction of Fluorine. H. Moissan and J. Dewar. (*Comptes Rendus*, cxxiv. 1202.) By using liquid oxygen as the refrigerant in a suitable apparatus the author has succeeded in condensing pure fluorine to a yellow, very mobile liquid at a temperature of -185° C. A description of the apparatus and manipulations employed is given in the paper.

Argon and Helium. B. Brauner. (*Chemical News*, lxxiv. 223, 224.) The author inclines to the view that argon and helium are allotropic states of nitrogen and hydrogen of a peculiar and entirely novel character, and suggests that determinations of their specific and atomic heats would throw important light on this question.

Argon and Helium. W. Ramsay and J. N. Collie. (*Comptes Rendus*, cxxiii. 214-217 and 542; *Ber. der deutsch. chem. Ges.*, xxix. 1043, 1044.) The results obtained by Runge and Paschen have raised the question whether helium might not be a mixture of two different gases. In order to throw further light on this question, both with regard to helium and argon, the authors have fractionated both gases systematically, by causing them to diffuse through pipe-clay. In the case of argon the various fractions showed the same characters; but in that of helium it was possible to effect a separation into a gas of 1.874 specific gravity and a refracting power of 0.1350, and another having a specific gravity of 2.133 and a refracting power of 0.1524. Both fractions, however, gave precisely the same spectrum. In view of the latter fact and the somewhat close approximation of the two densities, the authors are not prepared to accept the differences referred to as a proof that helium is not an element. They regard it as conceivable that, under certain conditions, an elementary gas may be separable by diffusion into lighter and heavier particles; and they thus open up new and significant questions respecting the true conception of the gaseous state of substances in general.

Compound of Argon and Water. P. Villard. (*Comptes Rendus*, cxxiii. 377-379.) Under a pressure of 150 atmospheres at about 0° C., argon combines with water forming a crystalline hydrate, which decomposes when the pressure is diminished. In this respect argon resembles oxygen and nitrogen, though the latter require a higher pressure to enter into combination with water.

Lucium, the alleged New Element. W. Crookes. (*Chem. News*, lxxiv. 259.) Lucium, the supposed new element recently described by P. Barrière, has been carefully examined by the author, whose spectroscopic and chemical observations prove that the body in question is not a new element but merely impure yttrium.

Philippium, a New Element. M. Delafontaine. (*Chem. News*, May 14, 1897.) The author claims to have discovered a new element, *philippium*, Pp, which is closely allied to cerium and terbium. It is stated to stand in the same relation to yttrium as cerium does to lanthanum. It has been found in gadolinites, samarskite, and the mineral from Bluffton (Slano county, Texas), described and analysed as fergusonite by Hidden and Mackintosh. The latter was the source from which it was extracted. Particulars respecting its extraction and properties will be found in the original paper.

Re-Determination of the Atomic Weight of Magnesium. T. W. Richards and H. G. Parker. (*Zeitschr. für anorg. Chem.*, xiii. 81-100.) A series of careful re-determinations carried out by the authors show the following results, compared with the atomic weight of oxygen:—

$$\text{O} = 16.00, \text{Mg} = 24.362.$$

$$\text{O} = 15.96, \text{Mg} = 24.301.$$

Atomic Weight of Carbon. A. Scott. From a paper read before the Chemical Society. (*Proc. Chem. Soc.*, No. 177, 70, 71.) The author calls attention to the unsatisfactory nature of and the various sources of error in the experimental evidence on which the determinations of the atomic weight of carbon rest. He also deals with the consideration of more accurate methods of determination and the results obtained therewith. The re-calculated values are 12.008 from the combustion of the various forms of carbon, and 12.050 from the conversion of the monoxide into the dioxide.

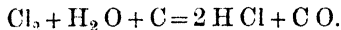
The Direct Union of Carbon and Hydrogen. W. A. Bone and D. S. Jerdan. (*Proc. Chem. Soc.*, 1896, No. 169.) In a previous report the authors stated that they had produced methane by passing a slow current of hydrogen, free from hydrocarbon impurities, over purified carbon heated to bright redness in a porcelain tube placed inside a Fletcher injector furnace.

The products of the union of carbon with hydrogen at the temperature of the electric arc have now been more thoroughly

studied. The electric arc was formed between terminals of purified gas carbon in an atmosphere of dry hydrogen contained in a glass globe standing in a trough over mercury. The arc was maintained in hydrogen for an hour or more, and samples of the gas were drawn off at the end of 5, 15, 30, 45, etc., minutes in each experiment. These were afterwards analysed in a modified form of the McLeod gas-analysis apparatus.

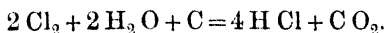
The gases almost always contained small amounts of hydrocyanic acid, due to the presence of a little nitrogen in the hydrogen employed. Acetylene was always present in considerable quantities, and, in addition to this and any other unsaturated hydrocarbon, appreciable quantities of methane were found.

Action of a Mixture of Chlorine and Steam on Red-hot Coal. A. Naumann and F. G. Mudford. (*Ber. der deutsch. chem. Ges.*, 1897, 347-354.) For the purpose of converting chlorine into hydrochloric acid, R. Lorenz has employed a process consisting in the passing of the gas through boiling water and then allowing the mixture of chlorine and aqueous vapour thus obtained to act on carbon heated to dull redness. According to him the reaction occurs in accordance with the following equation:—



The authors of the present paper have investigated this reaction, and arrive at the following conclusions:—

1. The reaction takes place chiefly in accordance with the equation—



2. The change indicated by the equation given by Lorenz ($\text{Cl}_2 + \text{H}_2\text{O} + \text{C} = 2\text{HCl} + \text{CO}$) is checked or limited by the action of chlorine and steam on the carbonic oxide, viz., $\text{Cl}_2 + \text{H}_2\text{O} + \text{CO} = 2\text{HCl} + \text{CO}_2$.

3. The process is accompanied by an evolution of heat, which, when working on a large scale, will considerably reduce the expenditure of fuel.

Combustion of Nitrogen. O. Bleier. (*Ber. der deutsch. chem. Ges.*, 1897, 1269.) A mixture of nitrogen with the proper proportion of oxygen is introduced into a thick tube containing a dilute solution of alkali; a large proportion of oxy-hydrogen is then pumped into the tube, the mixture exploded, and the resulting oxides of nitrogen removed by shaking with the alkali solution. A further quantity of oxy-hydrogen is then introduced and the same process repeated a number of times.

Presence of Nitrites in the Air. G. Defren. (*Chem. News*, lxxiv. 230, 231.) The author's results show that, where gas is burning, nitrites exist in the air even in well-ventilated rooms, and that water absorbs these nitrites in quantities increasing with the time of exposure to the polluted air. The formation of nitrites by the combustion of gas is attributed to the incomplete oxidation of the nitrogenous constituents contained in it.

The Constitution of the so-called "Nitrogen Iodide." F. D. Chattaway. From a paper read before the Chemical Society. (*Journ. Chem. Soc.*, December, 1896, 1572-1583.) The results of the author's investigation point to the conclusion that only one compound is formed by the action of ammonia on iodine, and that in this, one atom of nitrogen is associated with two atoms of iodine. Whether the simplest molecular formula of this substance is $\text{N H}_3 \text{I}_2$ or N H I_2 , remains yet to be determined; but at present the formula $\text{N H}_3 \text{I}_2$ seems best to accord with its reactions and to express the known facts regarding it. A further investigation of this compound is proceeding.

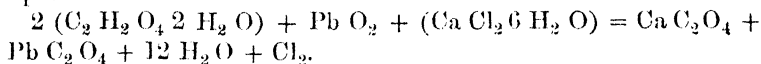
Note on the Constitution of the so-called "Nitrogen Iodide." J. W. Mallet. (*Proc. Chem. Soc.*, No. 175.) The author disagrees with the conclusion arrived at by F. D. Chattaway (preceding abstract) that the ratio of nitrogen to iodine in the explosive compound is 1:2. His own results are more in harmony with the ratio of 1:3. In view of the fact that the preparation which gave these results had been freely washed with alcohol and afterwards with ether, he does not think it probable that any considerable formation and retention of iodoform raised the proportion of iodine. He also alludes to the bearing on this question of the analogy of this explosive compound to nitrogen trichloride, the formula of which seems to have been fairly well established by Gattermann.

The author, however, does not dispute the existence of a compound of the composition $\text{N H}_3 \text{I}_2$, and points out that this formula agrees well with the results obtained in the analysis of a liquid non-explosive compound reported upon by W. H. Seamon in *Chem. News*, 1881, xliv. 188. This body was obtained by the action of dry ammonia gas on solid iodine, and appears to be identical with the substance prepared in a different way by Guthrie.

Volatility of Red Phosphorus. H. Arctowski. (*Zeitschr. für anorg. Chem.*, xii. 225-228.) When red phosphorus, which has been freed from ordinary phosphorus by washing with carbon

bisulphide, is heated in a vacuum at 100° C. for 48 hours, it volatilizes and condenses in the form of very minute, transparent crystals of a carmine-red colour.

Extemporaneous Preparation of Chlorine Water. G. Griggi. (*Pharm. Era*, xvii. 512.) 1.8 gramme of oxalic acid, dissolved in a small quantity of water, is added to a weak solution of 2.19 grammes of crystallised calcium chloride in which 2.39 grammes of lead peroxide are suspended; the total quantity of water in the mixture should be 200 c.c. After thorough agitation a fairly saturated solution of chlorine is obtained, which is separated from the precipitated calcium and lead oxalates by filtration. The reaction occurs in accordance with the following equation:—



Action of Bromine on Chlorides. F. Blan. (*Monatsh. Chem.*, xvii. 547.) The author finds that when a solution of sodium chloride is agitated with bromine, and the latter then expelled by means of a rapid current of air, a slight liberation of chlorine takes place. This was proved by the analysis of the remaining solution and by that of the liquid obtained on passing the volatile products through solution of sodium hydrate.

Hyponitrous Acid. A. R. Hantzsch and L. Kaufmann. (*Liebig's Annalen*, cxcvii. 317–340.) Hyponitrous acid, $\text{H}_2 \text{N}_2 \text{O}_2$, is obtained in the solid state by adding the silver salt gradually to ethereal hydrochloric acid until silver chloride ceases to be precipitated, and rapidly evaporating the filtrate in a desiccator. The silver salt is best prepared by reducing a strongly alkaline solution of sodium nitrite with sodium amalgam, and after removal of hydroxylamine with mercuric oxide, adding silver nitrate to the solution acidified with nitric acid.

The acid forms deliquescent laminar crystals soluble in ether, chloroform and benzol, and freely soluble in water and alcohol. The perfectly dry acid explodes spontaneously, but the crystals moistened with ether change but slowly. It is most stable in alkaline, less so in aqueous, and least in acidified solutions. Its decomposition products contain nitrous acid and ammonia. A number of compounds of this acid are described in the paper.

Formation of Dithionic Acid in the Oxidation of Sulphurous Acid by Potassium Permanganate. T. S. Dymond and F. Hughes. (*Proc. Chem. Soc.*, No. 175.) When a solution of sulphurous acid is titrated with a solution of potassium per-

manganate, decolorisation of the permanganate ceases when only 89 per cent. of the quantity required to oxidise the sulphurous acid to sulphuric acid has been used. This is due to the formation of dithionic acid in addition to sulphuric acid. The proportion of the former is constant, and is not influenced by either the dilution or the temperature or the acidity of the solution. Its production, therefore, appears to be an essential part of the reaction, and to be due to the weak oxidising action of the permanganate in the final stage of its reduction. The sulphuric and dithionic acids produced are in the proportion required by the supposition that manganese heptoxide is first reduced to the red oxide with production of sulphuric acid, and further reduced to the monoxide with production of dithionic acid. When, however, sulphurous acid is treated with the red oxide, sulphuric acid is the only product.

Presence of Boric Acid in Commercial Alkalies. M. Georges. (*Journ. de Pharm.* [6], iii. 346, 347.) The author confirms Venable and Callison's observation respecting the occurrence of small quantities of boric acid not merely in commercial but also in purified caustic potash and soda. He considers it likely that the contamination of reagents with this acid may account for the frequency with which borates are found in a variety of vegetable products, and therefore calls attention to this contamination as a probable source of error in analysis.

Sodium Tetraborate. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 712.) The salt, which is incorrectly called by this name, and now frequently used as a therapeutic agent, may be rapidly prepared by heating an intimate mixture of 1.9 parts of powdered borax, 0.6 part of powdered boric acid, and 0.1 part of water in a porcelain dish on a steam-bath, the mixture being well stirred all the time. The resulting fused mass is then allowed to cool and broken up into fragments.

Stability of Weak Solutions of Potassium Iodide. F. Eschbaum. (*Pharm. Zeitung*, xlii. 353.) While strong solutions of potassium iodide soon exhibit signs of decomposition, weak solutions, containing 2 per cent. of the salt or less, possess much greater stability. If such weak solutions be made with perfectly pure water distilled from a glass retort, they can be kept for several years without suffering decomposition.

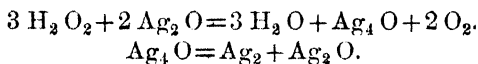
Calcium Carbide as a Reducing Agent. N. Warren. (*Chemical News*, lxxv. 2.) Litharge is energetically reduced by calcium carbide at a red heat. With an excess of the former, the pro-

ducts are calcium oxide and metallic lead, while with an excess of the carbide, carbonic anhydride is evolved and an alloy of lead and calcium obtained. Similar calcium alloys can be obtained from the oxides of manganese, nickel, cobalt, chromium, and several other metals. They are slowly but completely decomposed in contact with steam.

Action of Chromic Acid on Hyposulphites. A. Longi. (*Gazz. Chim. Ital.*, xxvi. 119-141; *Ber. der deutsch. chem. Ges.*, xxix. 1049, 1050.) A definite quantity of chromic acid requires for its reduction a proportion of sodium hyposulphite varying with the temperature, the nature and proportion of the acid employed, the degree of dilution, and the greater or less speed with which the hyposulphite is added. The first product of the action is tetrathionic acid, which is finally converted into sulphuric acid by the further action of chromic acid. At the same time the tetrathionic acid, together with the yet undecomposed portion of hyposulphurous acid, reacts with chromic acid in such a manner that small quantities of sulphuretted hydrogen are produced, varying with the conditions of the experiment.

Ferrous Bromide. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 712.) The following process is recommended for the preparation of this salt:—10 parts of bromine and 45 parts of water are placed in a flask which is surrounded by water to keep it cool. 5 parts of fine iron filings are now very gradually added in small portions at a time; and after the colour of the solution has completely changed from reddish-brown to pale green, it is filtered, the filtrate evaporated to dryness, the residue powdered and exposed to sunlight until it appears white.

The Reaction of Hydrogen Peroxide with Silver Oxide. E. Riegler. (*Chem. Centr.*, from *Bull. Soc. Sc. Fiz.*, Bukarest, iv. 78-80.) The author arrives at the conclusion that the equations by which this reaction was hitherto represented must be abandoned in favour of the following:—



Mercury Oxychlorides. M. Dupuoy. (*Pharm. Journ.*, 4th series, iv. 82, from *Bull. de la Soc. de Pharm. de Bordeaux*, xxxvi. 269.) The brownish-red precipitate obtained on adding solution of borax to a solution of mercuric chloride is found by the author not to be a borate of the formula $\text{Hg B}_4 \text{O}_7$ (as was supposed by Tokayer), but a basic oxychloride of the composition Hg Cl_2 .

3 Hg O. The same product is obtained by adding sodium carbonate to an excess of boiling solution of mercuric chloride. Unless the mercuric salt is used in excess, other oxychlorides are formed.

Cupric Sulphide. J. B. Coppock. (*Chem. News*, lxxiii. 262.) When a solution of cupric sulphate is added in excess to a solution of sulphuretted hydrogen, the precipitate consists wholly of cupric sulphide, CuS . The sulphide obtained from acidified cupric solutions with an excess of sulphuretted hydrogen is contaminated with free sulphur.

Action of Sulphuretted Hydrogen on Solutions of Cupric Salts. B. Brauner. (*Chem. News*, lxxiv. 99.) The author has investigated the composition of the precipitate obtained from aqueous solutions of cupric salts with a slow or rapid current of sulphuretted hydrogen under varying conditions of dilution, acidity, and temperature. In each case sufficient sulphuretted hydrogen was used to ensure complete precipitation of the copper. The precipitate, in every instance, was found to contain free sulphur in addition to a mixture of CuS and Cu_2S , the relative proportions of which seem to vary with the conditions of the experiment. The exact conditions under which the larger proportion of one or the other of these two sulphides is produced are not yet known, and will be made the subject of future experiments.

New Artificial Production of Malachite. A. de Schulten. (*Comptes Rendus*, cxii. 1352-1354.) The author has previously shown that crystallised malachite can be obtained by heating an aqueous solution of cupric carbonate in ammonium carbonate on a water-bath. This process, however, affords no explanation of the formation of this mineral in nature; but a new method now communicated by him appears to throw light on this formation. A bottle tubulated near its bottom is fitted with a glass tube open at one end and closed at the other, in such a manner that the open end reaches into the bottle, while the outer closed end is slightly inclined downwards. The bottle is filled with a solution of cupric carbonate in water saturated with carbonic anhydride, and the tube heated in one place for 10 days with a very small flame. After this time the copper carbonate will be found to have mostly separated in the form of small malachite crystals in the tube.

Action of Acetylene on Cupric Salts. H. G. Söderbaum. (*Ber. der deutsch. chem. Ges.*, 1897, 760-765 and 814, 815.) On passing acetylene into an ammoniacal solution of cupric sulphate or nitrate, a black flocculent precipitate of the formula $\text{C}_{17}\text{Cu}_8\text{H}_4\text{O}_3$ is formed, the exact composition of which may

vary, however, with the temperature employed in the process, and also on account of the readiness with which it absorbs oxygen from the air. It is a black amorphous substance insoluble in water, and explodes when heated to about 75° C. If acetylene be passed into a neutral or slightly acid solution of cupric acetate, a precipitate of the composition $3 \text{C}_8\text{Cu}_4\text{O} + 2 \text{H}_2\text{O}$ is formed, differing from the one referred to in being non-explosive, and by its stability on exposure to air.

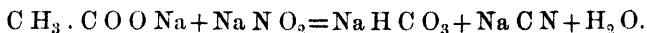
Cause of the Toxicity of Arsenical Wall-Papers. B. Gosio. (*Ber. der deutsch. chem. Ges.*, 1897, 1024–1026.) The author attributes the toxic effects of arsenical wall-papers chiefly to the development of gaseous, highly poisonous arsenic compounds under the influence of micro-organisms. Among these organisms he mentions *Penicillium brevicaulis* as the most active; *Mucor mucedo*, *Aspergillus glaucus* and *A. virens* are also believed to exercise a similar influence. At the same time the author does not wish to deny that some of the injurious effects of arsenical wall-papers may be due directly to the pigment detaching itself from the paper in the form of dust.

Basic Bismuth Benzoate. M. Rebière. (*Pharm. Journ.*, 4th series, iv. 82, from *Bull. de la Soc. de Pharm. de Bordeaux*, xxxvi. 272.) The author finds commercial samples of this preparation to be very variable in their composition. He criticises the official process of the French Codex, and suggests in its place a method consisting in the addition of the theoretical quantity of finely powdered benzoic acid to freshly precipitated and washed bismuth hydrate (in a weighed portion of which the exact percentage of Bi_2O_3 has been previously determined), in order to produce a compound of the formula $\text{BiO}(\text{C}_7\text{H}_5\text{O}_2)$. The resulting mixture is freely diluted with water, well stirred, then allowed to settle for 24 hours, the precipitate collected on a cloth filter, well drained, and dried in the air.

Hydrated Sodium Salicylate. G. Romijn. (*Ned. Tydschr. Pharm.*, 1896, 111–113. From *Journ. Chem. Soc.*) Sodium salicylate, when dissolved in its own weight of water, after a time deposits large prismatic crystals showing double refraction, and containing $6 \text{H}_2\text{O}$. If crystallisation will not readily set in, it may be promoted by introducing a crystal from a previous experiment.

As might be expected, the crystals very rapidly effloresce, and the water is quickly expelled on drying at 80° .

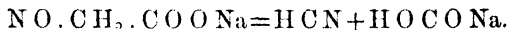
Conversion of Nitrites into Cyanides. W. Kerp. (*Ber. der deutsch. chem. Ges.*, 1897, 610-612.) When sodium or potassium nitrite is fused with sodium acetate, cyanide is formed.



The yield of cyanide, however, does not exceed 25 per cent. of the quantity calculated from this equation, a large proportion of the cyanogen formed being eliminated as hydrocyanic acid. A closer investigation of the reaction leads the author to infer that in its first phase sodium hydrate is formed together with sodium nitrosoacetate:—

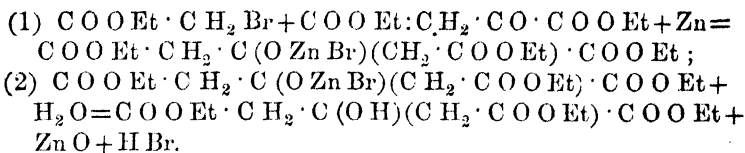


The nitrosoacetate is then split up into free hydrocyanic acid and sodium bicarbonate:—



The hydrocyanic acid combines only partially with the sodium hydrate to form sodium cyanide; the greater part escapes with the aqueous vapour, while the remainder of the alkaline hydrate reduces the bicarbonate to monocarbonate. The final products of the reaction are therefore sodium carbonate and sodium cyanide.

A Synthesis of Citric Acid. W. T. Laurence. (*Proc. Chem. Soc.*, No. 176.) Ethylic citrate was obtained synthetically by the condensation of ethylic bromacetate with ethylic oxalylacetate in the presence of zinc, as indicated by the following equations:—



The yield of ethylic citrate is very poor owing to other reactions proceeding simultaneously. To further confirm the formation of ethylic citrate, it was converted into the calcium salt of citric acid, and a substance obtained showing the characteristic properties of calcium citrate.

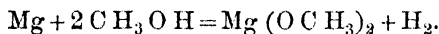
The same salt was also obtained by heating the zinc compound formed in equation No. 1 with alcoholic potash and precipitating the calcium citrate from the hot solution. The results were all confirmed by analysis.

Action of Alcohols on Mercuric Chloride. M. Fonzes-Diacon. (*Bull. Soc. Chim.* [3], xv. 762, 763.) Ethyl alcohol, like glycerine, reduces mercuric chloride to calomel, though somewhat more slowly. The same reduction is effected more energetically by mannite. The energy of the reaction with different alcohols appears to increase with the number of hydroxyl groups in the latter.

Action of Magnesium on Alcohols and other Organic Compounds.
Preparation of Allylene. E. H. Kaiser. (*Amer. Chem. Journ.*, xviii. 328-332.) By passing the vapours of alcohols or of acetone over magnesium heated in the tube of a combustion furnace, a gas mixture is obtained consisting chiefly of hydrogen and saturated and unsaturated hydrocarbons, and containing only traces of carbonic anhydride and carbonic oxide. The residue retains a part of the hydrocarbons, forming with them magnesium-allylid, which is decomposed by water containing ammonium chloride. From the hydrogen simultaneously evolved, allylene can be separated by means of ammoniacal solution of silver nitrate. The best yield of allylene under these conditions was obtained from acetone.

Aluminium Alcoholates. H. W. Hillyer. (*Amer. Chem. Journ.*, xviii. 621, 622.) By the action of alcoholic solution of mercuric chloride on aluminium, a volatile substance is obtained which appears to have the composition $\text{Al}(\text{O C}_2\text{H}_5)_2\text{H}$. Tetra-chloride of tin produces the same result as mercuric chloride. By means of the latter, analogous compounds were obtained from propyl-, isopropyl-, and amyl alcohols.

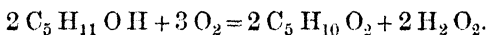
Magnesium Methylate. E. Szarvasy. (*Ber. der deutsch. chem. Ges.*, 1897, 806-809.) The author has studied the action of methyl alcohol on metallic magnesium, and has obtained a product of the formula $\text{Mg}(\text{O C H}_3)_2$ in accordance with the equation:—



The white amorphous product combines with methyl alcohol, forming a crystalline compound of the formula $\text{Mg}(\text{O C H}_3)_2 + 3 \text{C H}_3 \text{O H}$. On heating a methyl alcohol solution of these crystals, the methylate is precipitated in its original amorphous condition.

Action of Light on Amyl Alcohol. A. Richardson and Emily C. Fortey. Abstract of a paper read before the Chemical Society. (*Journ. Chem. Soc.*, September, 1896, 1349-1352.) The authors have investigated the action of sunlight on pure amyl alcohol

in presence of oxygen, and report that this action results in the formation of hydrogen peroxide and of valerianic acid. The formation of H_2O_2 does not depend on the presence of moisture, for it occurs also when every care is taken to employ perfectly anhydrous amyl alcohol and thoroughly desiccated oxygen in the experiment. The decomposition is represented by the following equation:—



No carbon dioxide is evolved in the reaction, and the only difference in the products of this oxidation of amyl alcohol and that effected by means of ordinary oxidising agents appears to consist in the formation of hydrogen peroxide instead of water.

Methyl, ethyl, propyl, and butyl alcohols were also experimented with, but even after prolonged exposure to light and oxygen no indication of hydrogen peroxide could be obtained either with titanous acid or with potassium bichromate and ether. Amyl alcohol, when exposed to oxygen in the dark, shows no sign of oxidation.

Note on the Action of Light on Ether. A. Richardson and Emily C. Fortey. Abstract of a paper read before the Chemical Society. (*Journ. Chem. Soc.*, September, 1896, 1352–1355.) The authors' experiments were conducted with pure and absolutely anhydrous ether and perfectly dry oxygen. After three days' exposure to light, the liquid gave a well-marked peroxide reaction when tested with titanous acid.

In order to investigate the other products formed, a sample of ether was exposed for many weeks in presence of water and oxygen. It was then rich in hydrogen peroxide, and gave an acid reaction, due to acetic acid. The neutralised solution was distilled on the water-bath. The distillate, consisting chiefly of ether, gave unmistakable indications of aldehyde by the usual tests. No carbon dioxide was formed in the reaction; and here, too, as in the case of amyl alcohol, this oxidation merely differs from that produced by ordinary oxidising agents in the formation of hydrogen peroxide in the place of water.

Action of Phosphoric Acid on Ether in Presence of Water. M. Berthelot and G. André. (*Comptes Rendus*, cxxiii. 344–349.) When a cold, moderately dilute, aqueous solution of phosphoric acid is shaken with ether, an equilibrium is established after a very small proportion of the acid has passed into the ether. On treating liquefied phosphoric acid (or its very concentrated solu-

tion) with ether, heat is evolved and a uniform liquid is produced which can be diluted with ether in any proportion without any separation taking place. This ethereal phosphoric acid is also capable of dissolving a small quantity of water, but if the proportion of the latter be somewhat increased, an ethereal layer rich in phosphoric acid begins to separate. Further additions of water increase this ethereal layer, and correspondingly diminish the proportion of phosphoric acid contained in it; and this change continues until sufficient water has been added to bring about the same conditions obtained on shaking dilute phosphoric acid with ether. These observations can be explained by assuming that strong phosphoric acid and ether form a peculiar compound differing essentially from the ethyl-ether of phosphoric acid, and that this compound is decomposed by the addition of a large proportion of water.

The Purity of Chloral Hydrate. E. Hirschsohn. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 298, from *Pharm. Zeitschr. für Russl.*) In place of the usual method for recognising the presence of chloral alcoholate in this preparation, the author recommends the following mode of testing:—1 gramme of the chloral hydrate under examination is covered in a test-tube with 1 c.c. of nitric acid of 1.38 specific gravity. No yellow coloration of the mixture nor any evolution of yellow vapours ought to take place either on standing at an ordinary temperature for ten minutes, or on the subsequent application of a gentle heat.

Influence of Chloral Hydrate on the Reaction between Iodine and Starch. E. Schär. (*Pharm. Centr.*, xxxvii. 540–542.) The author's results show that, under certain circumstances, the formation of the blue iodide of starch may be considerably retarded or even prevented by the presence of an excess of chloral hydrate.

Action of Chloroform on Starch. F. Musset. (*Pharm. Centr.*, xxxvii. 587, 588.) When a zinc chloride solution of starch is mixed with a little chloroform and allowed to stand for three months, the starch is converted into dextrins, which can then be precipitated from the solution by means of alcohol. Starch mucilage is converted by chloroform into a modification resembling the soluble starch obtained by means of hydrochloric acid. If the mixture be boiled after a few months, the starch dissolves and separates again on cooling in the form of a transparent jelly.

The Experimental Methods employed in the Examination of the Products of Starch-Hydrolysis by Diastase. H. T. Brown, G. H. Morris, and J. H. Millar. (*Proc. Chem. Soc.*, No. 172, 241, 242.)

This paper is divided into the following sections: (1) the determination of solids from solution-density; (2) determination of specific rotatory power; (3) the relation of $[\alpha]_T$ to $[\alpha]_D$; (4) determination of cupric reducing power; (5) limits of accuracy of the methods. For particulars, reference should be made to the original. The reader is also referred to the same source, pp. 242-244, for reports by the same authors on "The Specific Rotation of Maltose and of Soluble Starch," and on "The Relation of the Specific Rotatory and Cupric-Reducing Powers of the Products of Starch-Hydrolysis by Diastase." A full account of all these researches will be found in *Journ. Chem. Soc.*, January, 1897, 72-115.

The Action of Diastase on Starch. A. R. Ling and J. L. Baker. (*Proc. Chem. Soc.*, No. 173, 3, 4.) The authors have examined the products of the limited action of diastase on starch at 70° , and have separated maltose and the following unfermentable substances, which were purified to such an extent as to free them from all extraneous matter.

Maltodextrin α , $C_{36}H_{62}O_{31}$, identical with Brown and Morris's maltodextrin, but having the properties $[\alpha]_D = 180$; $R = 32.81$.

Maltodextrin β , $C_{24}H_{42}O_{21}$, identical with Prior's "achroodextrin III," and having the properties $[\alpha]_D = 171.6$ and $R = 43$.

A substance, $C_{12}H_{22}O_{11}$, isomeric with maltose, and obtained from the unfermentable residue of that particular fraction previously called isomaltose by Lintner. It had the constants $[\alpha]_D = 156$ and $R = 62.5$, and may consist of the simple "dextrin," $C_{12}H_{20}O_{10} + H_2O$, the existence of which the authors' previous work foreshadowed. Inasmuch as it gave a small amount of crystalline osazone, it perhaps contained maltose.

When the three substances above named are treated with an excess of diastase at 60° for a few hours, the approximate reducing powers of the products are $R = 90$; 91.5 ; 94 , respectively.

From all the data now known, the conclusion is justified that starch, when hydrolysed by diastase, is converted into a series of maltodextrins of gradually decreasing molecular weight and optical rotatory power, and of increasing reducing power. These appear to have the optical and reducing properties of mixtures of the original starch and maltose.

Action of Dilute Acids on Arabinose. M. Berthelot and G. André. (*Comptes Rendus*, cxxiii. 625-631.) On boiling arabinose with water under ordinary conditions, no conversion into furfural takes place, but this change occurs readily when the two sub-

stances are heated in a closed tube under pressure. In the latter case, heating at 200° for five hours yields about 50 per cent. of the theoretical quantity of furfural. The action of dilute acids on arabinose proceeds in three different directions:—(1) Formation of copious quantities of furfural during distillation; glucoses under the same condition yield but little furfural. (2) Formation of humic acid, $C_{20}H_{14}O_6$, especially in closed vessels; the formation of this acid occurs here much more readily than with glucoses. (3) Slow formation of carbonic anhydride, especially during slow distillation; in this respect arabinose behaves exactly like glucoses.

A New Synthesis in the Sugar Group. H. J. H. Fenton. (*Proc. Chem. Soc.*, No. 176.) In previous communications, it has been shown that the acid (dihydroxymaleic acid) obtained by oxidation of tartaric acid in presence of iron, decomposes on heating with water almost quantitatively into glycolic aldehyde and carbon dioxide. Also, that this aldehyde, when heated in a vacuum, undergoes condensation, yielding a sweet-tasting, solid gum which has the formula $C_6H_{12}O_6$.

The present paper describes an investigation which has been made upon the properties of this condensation product.

It is easily soluble in water, and its solution quickly reduces Fehling's solution and ammoniacal silver nitrate. It gives various colour-reactions characteristic of "sugars," and, after purification with alcohol, yields, with phenylhydrazine, a normal hexosazone, $C_{18}H_{22}N_4O_6$, melting at $168-170^{\circ}$. Heated with water to 140° , it yields furfural. It is optically inactive, and appears to be incapable of fermentation by yeast.

The purified "sugar," when further heated in a vacuum to $100-106^{\circ}$, loses water and becomes hard and brittle. After 2-4 hours' heating it has the composition $C_{12}H_{22}O_{11}$, and after 24 hours' heating the composition nearly approximates to $C_6H_{10}O_5$.

Transformation of Sugars under the Influence of Lead Hydrate. C. A. L. de Bruyn and W. A. van Ekenstein. (*Ber. der deutsch. chem. Ges.*, 1896, No. 12, 595.) The authors are engaged in an investigation of this subject, and now issue a preliminary report in consequence of a research in a similar direction recently published by H. Svoboda. The latter has observed that basic lead acetate causes in various sugars an alteration in their rotatory power, and he considers that under certain circumstances a complete decomposition may be effected by means of this lead salt. The authors of the present paper refer to their previous re-

sults according to which alkalies cause a molecular rearrangement in different sugars, but not a complete disruption which could only be effected by the prolonged action of alkalies in very strong solutions. Experiments with lead hydrate in the place of alkalies have now shown that the action of the former differs somewhat from that of the latter. Glucose when heated with lead hydrate yields mannose, but no fructose; fructose, although transformed, yields neither glucose nor mannose, as it does with potash. Mannose, also, is not at all, or only very slightly, transformed into fructose. The comparative action of lead hydrate and potash on glucose, mannose, fructose and galactose is given in a table containing the specific rotatory power for details of which the original paper (in *Rec. Trav. Chim. Pays-Bas*, xv. 92-96) should be consulted.

Preparation of Glycerose. M. Fonzes-Diacon. (*Bull. Soc. Chim.* [3], xiii. 862, 863.) When a mixture of anhydrous glycerine and mercuric chloride is heated to 160° C., the latter is energetically reduced to mercurous chloride and subsequently to metallic mercury. On neutralising the resulting liquid with sodium carbonate and filtering, a yellow product possessing marked reducing properties is obtained. The osazone of this compound, when repeatedly purified by dissolving in alcohol and reprecipitating with water, is a crystalline powder agreeing in its melting point and other properties with the phenylglycerosazone obtained from glycerose by Fischer and Tafel in 1887.

Preparation of Mannose. D. de Witt. (*Chem. Centr.*, 1896, ii. 862, 863. From *Journ. Chem. Soc.*) The author recommends the decomposition of the phenylhydrazone of mannose with benzaldehyde as a means of obtaining mannose. 1 kilo. of ivory-nut turnings was heated with 2 litres of 6 per cent. hydrochloric acid for six hours, filtered, washed with hot water, the acid solution neutralised with solid sodium carbonate, again filtered, and decolorised with animal charcoal. The requisite quantity of phenylhydrazine hydrochloride and an excess of sodium acetate, dissolved in water, were added, and the crystals thus obtained were heated for two hours with a mixture of benzaldehyde, alcohol, and water, and then filtered. The filtrate, on evaporation in a vacuum, gave a syrup which contained 89.6 per cent. of mannose.

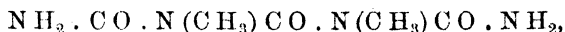
Bacteria in Commercial Sugar of Milk. A. R. Leeds. (*Amer. Chem. Journ.*, xviii. 687, 688.) All the specimens of milk-sugar, obtained by the author from the usual commercial sources, were

found to contain a "lactic ferment" and virulent bacteria. Pure crystallised lactose proved to be free from these impurities.

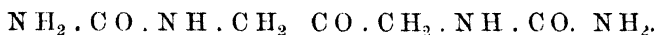
Formation of Urea by Oxidation. F. Hofmeister. (*Chem. Centr.*, 1896, 389, 390.) The author has obtained urea from a considerable number of organic substances by oxidation with a large proportion of potassium permanganate, in the presence of ammonia and ammonium sulphate. Among the substances which yielded this product on oxidation under the conditions named were: hydrocyanic acid, formamide, glycocine, aspartic acid, asparagine, leucine, gelatin, egg-albumin, methyl alcohol, glycollic acid, lactic, malic and tartaric acids, acetone, and pyrogallol.

Action of Formaldehyde on Urea. C. Goldschmidt. (*Ber. der deutsch. chem. Ges.*, 1896, 2438, 2439.) When a solution of urea in dilute hydrochloric acid is treated with an excess of formaldehyde for about an hour, a white granular precipitate is produced, which has the composition $C_5H_{10}N_4O_3$ and is insoluble in all ordinary solvents. It appears to be a condensation product of two molecules of urea with three molecules of formaldehyde, the formation of which is accompanied by the elimination of two molecules of water. The compound is decomposed by strong acids, but not acted upon by alkalis. Its formation may serve as the basis of a process for the estimation of urea.

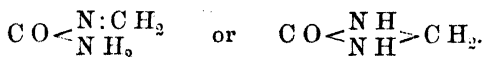
The constitution of this compound may be:—



unless it is to be regarded as hexahydroiso-uric acid:—



Methylene-Urea. B. Tollens. (*Ber. der deutsch. chem. Ges.*, 1896, 2751, 2752.) The author refers to a recent report on the "Action of Formaldehyde on Urea" by C. Goldschmidt (preceding abstract), and points out that the latter has omitted to make any reference to previous investigations of this subject by Hölzer and Lüdy (*Ber. der deutsch. chem. Ges.*, xvii. 659 and xviii. 3302; *Wien. Akad. Ber.*, cxviii. 191). These chemists, in studying the same action, have obtained an insoluble compound of the formula $C_2H_4N_2O$, which may be regarded as



The author considers it likely that Goldschmidt's compound, $C_5H_{10}N_4O_3$, may be closely related to this methylene-urea.

New Synthesis of Uric Acid. E. Fischer. (*Ber. der deutsch. chem. Ges.*, 1897, 559-573.) The author, in conjunction with L. Ach, has previously shown that pseudouric acids are converted by fusion with oxalic acid into the corresponding uric acids. He now finds that the same object may be attained more readily by heating with dilute mineral acids. This new process has the advantage of greater simplicity, and gives a better yield as well as a purer product. In the case of pseudouric acid itself, a large proportion of mineral acid is required; but this is not so with the more readily soluble methyl derivatives, the preparation of which resolves itself into a very simple operation. Full details will be found in the paper.

Compounds of Antipyrine with Cresols. G. Patein and E. Dufau. (*Bull. Soc. Chim.* [3], xv, 609, 610.) *o*-Cresolantipyrine is produced on fusing a mixture of *o*-cresol and antipyrine; it forms colourless crystals melting at 60-62° C. *m*-Cresolantipyrine and *p*-cresolantipyrine were obtained in the form of uncrystallisable liquids, which are split up into their constituents by sulphuric acid.

Compounds of Antipyrine with Oxybenzoic Acids and their Derivatives. G. Patein and E. Dufau. (*Comptes Rendus*, cxxii, 1335-1338.) By combining one molecule of salicylic acid with one molecule of antipyrine, the substance well known by the name of salipyrine is formed. Analogous antipyrine compounds can also be obtained with the two other oxybenzoic acids. Two molecules of antipyrine, however, cannot be combined with one molecule of oxybenzoic acid, and as the phenols, too, form antipyrine compounds, it appears that the phenol hydroxyl group, and not the carboxyl group, is the cause of the formation of the compounds of antipyrine and oxybenzoic acid referred to. Some interest attaches to the observation that a mixture of antipyrine and sodium salicylate liquefies on exposure to air and becomes dry again over sulphuric acid, whereas neither of the two substances alone possesses hygroscopic properties.

Formopyrine. F. Stolz. (*Ber. der deutsch. chem. Ges.*, xxix, 1826-1828.) This substance obtained by Marcourt by the action of strong formaldehyde solution on a solution of antipyrine (*Year-Book of Pharmacy*, 1896, 181), is found by the author to be identical with methylenedianthipyrine.

Economical Preparation of Hydroxylamine Sulphate. E. Divers and T. Haga. (*Journ. Chem. Soc.*, December, 1896, 1665, 1666; *Proc. Chem. Soc.*, No. 169.) Sodium nitrite yields nearly its own

weight of hydroxylamine sulphate when carefully sulphonated by the addition of sodium sulphite, and hydrolysed. In sulphonating, the concentrated solution of sodium nitrite and sodium carbonate (in the proportion of one molecule of the latter to two molecules of the former) must be kept slightly below 0°C ., while sulphur dioxide is introduced in just sufficient quantity to produce acid reaction. The hydrolysis in its second stage must not be carried out at a boiling heat, because then much hydroxylamine is destroyed. At $90\text{--}95^{\circ}$ the hydrolysis is satisfactorily effected in two days. After neutralisation, the sodium sulphate is separated, and the hydroxylamine sulphate crystallised out. It is a non-deliquescent salt, soluble in three-fourths of its weight of water at 20° , and crystallises well.

Free Hydrazine. C. A. L. de Bruyn. (*Rec. Trav. Chim.*, xv. 174–184; *Journ. Chem. Soc.*, 1897, ii. 22, 23.) The free base is best prepared by the action of barium oxide on hydrazine hydrate; the precautions required are fully described in the paper. It melts at 1.4° , and has a specific gravity of 1.014 at 15°C . Its boiling points, determined in an atmosphere of dry hydrogen, are 56° at 71 mm., 113.5° at 761.5 mm., and 134.6° at 1490 mm. pressure. It is miscible in all proportions with methyl, ethyl, propyl, isobutyl, and amyl alcohols, but is only very sparingly soluble in other organic solvents. It is capable of dissolving many salts.

Hydrazine apparently combines with sodium chloride, as a considerable amount of heat is developed on mixing the two and the whole sets to a crystalline mass on cooling. Ammonium salts are decomposed by the base, and lead nitrate is dissolved by it. The base itself may be heated to $300\text{--}350^{\circ}$ without undergoing perceptible decomposition. The critical temperature is 380° . The decomposition first proceeds according to the equation $2\text{N}_2\text{H}_4 = \text{N}_2 + \text{H}_2 + 2\text{NH}_3$, but the final decomposition is represented by $3\text{N}_2\text{H}_4 = \text{N}_2 + 4\text{NH}_3$.

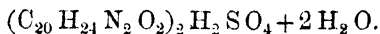
The base is a strong reducing agent, it readily bursts into flame in chlorine, bromine and iodine also react violently. It is slowly oxidised by dry air free from carbonic anhydride, and also by oxygen; in the latter case, the temperature gradually rises to 100° , and ammonia can readily be recognised. Yellow phosphorus also acts on an aqueous solution of the base, forming, probably, hydrides of phosphorus.

Bases contained in Fusel Oil. E. Bamberger and A. Einhorn. (*Ber. der deutsch. chem. Ges.*, 1897, 224–229.) The

authors' results show that fusel oil, and also the so-called "pure amyl alcohol" of commerce, contains pyridine and a dimethylpyrazine. It is pointed out, therefore, that if this alcohol is employed as a solvent in reductions by means of sodium, the bases referred to are likely to occur among the products of the reaction.

Quinine Hydrochloro-Sulphate. M. Georges. (*Journ. de Pharm.*, 1896, 589-594.) The pharmaceutical preparation used under this name in France has been chemically and optically examined by the author, whose results prove that it is a mere mixture of sulphate and hydrochloride of quinine. This conclusion is also confirmed by the microscopic characters of the preparation.

The Efflorescent Nature of Crystallised Quinine Sulphate. A. J. Cownley. (*Pharm. Journ.*, 4th series, iii. 525.) The author has previously shown that crystalline quinine sulphate—containing $7\frac{1}{2}$ molecules of water of crystallisation, or 15.32 per cent.—when freely exposed to air at the ordinary temperature rapidly effloresces until it attains the composition of a sulphate containing 2 molecules of water, or 4.6 per cent.; also that the salt rendered anhydrous at 100° C., when freely exposed to air at the ordinary temperature, readily re-absorbs water until it has the composition of a sulphate containing 2 molecules of the latter. On the strength of these observations the author again advocates that the official quinine sulphate should be a salt of constant composition as regards its water of crystallisation, a requirement fully answered by the air-dried salt of the formula—



The variability of commercial quinine sulphate is shown by the analysis of 40 samples, in which the water was found to range from 8 to 15.9 per cent. The author's results are further confirmed by E. H. Farr and R. Wright, who emphatically support his suggestion (*Pharm. Journ.*, 203).

The Testing of Quinine Sulphate. M. Kubli. (*Pharm. Zeitschr. für Russl.*, xxxiv. 593-598, 609-613, 625-628, 641-646; *Pharm. Journ.*, 4th series, iii. 157, 158.) The author introduces two new tests for the purity of quinine, one of which he calls the water test, and the other the carbon dioxide test.

The water test is carried out in the following manner:—1.793 grammes of quinine sulphate which have been dried at 40° to 50°, and contain, therefore, 4.6 per cent., or two molecules of water

of crystallisation, or an equivalent amount of the crystalline salt, are dissolved in 60 grammes of boiling water contained in a tared flask, the heating being continued for five minutes. Water is then added from a burette until the total weight amounts to 62 grammes. The contents of the flask are then cooled to 20° with frequent agitation, and allowed to stand for half an hour at 20° C. It is then filtered through a dry filter, and to 5 c.c. of the filtrate exactly three drops of a 10 per cent. solution of pure sodium carbonate are added. Water at 20° C. is then run in from a burette until the opalescence caused by the suspended alkaloids has disappeared. Chemically pure quinine sulphate requires exactly 10 c.c. of distilled water at 20° C. to cause the opalescence to disappear. With mixtures of cinchonidine sulphate and quinine sulphate there is an increase of 0.4 c.c. in the amount of water required for each per cent. of cinchonidine sulphate present in the sample.

The Carbon Dioxide Test.—When sodium carbonate is added to a solution of quinine sulphate saturated at the ordinary temperature, the precipitated alkaloid is very easily soluble in sodium bicarbonate, and on passing a stream of carbon dioxide into the solution the quinine separates as neutral carbonate in beautiful bunches of needles. In the presence of cinchonine, cinchonidine, and quinidine, either singly or together, the separation of the crystals is lessened and delayed, and the precipitate becomes more or less granular; if the amount of the other alkaloids exceed a certain limit, the separation is prevented altogether. Hydroquinine scarcely exerts the same influence. The following directions are given for carrying out the test:—5 c.c. of the saturated solution of the quinine sulphate, prepared in the same way as in the water test, are precipitated with three drops of neutral sodium carbonate, and the precipitate dissolved by adding 5 c.c. of sodium bicarbonate (free from carbonate). Carbon dioxide is then passed through the solution in a stream of about 80 to 100 bubbles per minute for thirty minutes at a temperature of 15° C.: it being essential that the gas be free from atmospheric air before it is passed through the quinine solution. The cylinder is now gently shaken until the volume of the supernatant liquid remains constant, which with a voluminous precipitate occupies thirty minutes or more. The contents of the cylinder are then placed in a tube graduated to $\frac{1}{10}$ c.c., and allowed to stand for from one to two hours until clear.

With samples of quinine sulphate containing from 1 to 3 per cent. impurity, the liquid frequently requires to stand until next day, the separation being hastened by frequent agitation.

According to these two methods of testing, a sample of quinine sulphate is to be regarded as chemically pure if it requires 10 c.c. of water in the water test, and gives a volume of quinine carbonate amounting to 1.4–1.5 c.c. in the carbon dioxide test. An impurity of 1 per cent. of other alkaloids requires 11 c.c. of water, and gives a precipitate of 1.8 to 2.0 c.c., of which only a part is granular; a 2 per cent. impurity requires not more than 12 c.c., and gives a granular precipitate of not less than 1.4 c.c.; 3, 4, and 5 per cent. impurity should not exceed 13, 14, and 15 c.c. by the water test, and give not less than 1 c.c., 0.8 c.c., and 0.5 c.c. granular precipitate of carbonate.

The Testing of Quinine Sulphate. O. Hesse. (*Archiv der Pharm.*, ccxxxiv. 195–203.) The author criticises the water test and the carbon dioxide test proposed by Kubli (preceding abstract), and points out that, according to his own experience, neither of these tests gives results equal in accuracy to the official tests, and further, that the results given by the two tests do not quite agree with one another.

Notes on the Testing of Quinine. D. Howard. (*Pharm. Journ.*, 4th series, iii. 505–507; also *Chemist and Druggist*, 1896, 846, 847.) The author reviews the work done by de Vrij, Hesse, Paul, and others, and deals particularly with the ammonia test and its various modifications. Among the difficulties which may arise in connection with this test, he mentions the curious fact that quinine sulphate, containing an addition of the free alkaloid, may under certain conditions require an excess of ammonia far exceeding the amount required by the neutral salt; and further, that the presence in the sulphate of a very small proportion of sodium or ammonium sulphate greatly diminishes the solubility of the quinine salt, so that the solution after cooling retains so little of the latter as hardly to yield any precipitate with ammonia. Reviewing the various suggestions which have been made with regard to the ether test, the author favours Prunier's proposal to cool the aqueous solution of the sample slowly to 50° C., and to maintain it at that temperature with frequent agitation for some time. A very large proportion of the quinine is thus crystallised, usually containing not more than 2 per cent. of cinchonidine, so that the solution filtered at this temperature will contain within 2 per cent. the whole of the cinchonidine. If this solution be then

evaporated to a small bulk and the magma obtained shaken with just enough ether and ammonia to produce a momentary solution, a crystallisation will form which bears a definite relation to the cinchonidine contained in the original sample. But, as is always the case when cinchonidine crystallises from ether in the presence of quinine, it will contain from 20 to 30 per cent. of quinine, according to the proportions of the two alkaloids in the solution. On the other hand ethereal solution of quinine will dissolve a proportion of the cinchonidine considerably in excess of the normal solubility of the alkaloid in ether. The failure of the ether test to indicate the presence of hydroquinine is not regarded as of much consequence, since this base does not occur to any greater extent than 2-4 per cent. in commercial quinine sulphate and does not appear to differ therapeutically from quinine. The ammonia test is considered by the author to offer great advantages in cases in which, as in the *Ph. Germ.* iii., a test for perfectly pure sulphate of quinine is required. He considers it, however, a grave question whether it is wise to insist on the use of a perfectly pure salt in pharmacy, since such a preparation can only be obtained at an increased expense greatly beyond the proportion of impurities removed. These impurities, moreover, are not only innocuous, but have the same therapeutic effects as quinine, though in a somewhat lower degree. It is pointed out that the result of an over-severe test is that a second quality is offered in the market which is habitually used, and that it is far more effective to have a practicable standard which can be, and is, insisted on.

With regard to the tests recently suggested by Kubli, the author appears to share the opinions expressed by Hesse (preceding abstract).

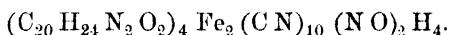
The Testing of Quinine Sulphate. A. Weller. (*Pharm. Zeitung*, 1894, 40.) The author describes the results of experiments showing that the tests for the purity of quinine sulphate recently suggested by Kubli (this vol. p. 46) are wanting in accuracy, and are not suitable to serve as official tests.

The Testing of Quinine Sulphate. L. de Koningh. (*Ned. Tydschr. Pharm.*, 1897, 97, 98.) The author proposes the following modification of de Vrij's chromate process:—A solution of 2 grammes of the sample in 80 c.c. of hot water is mixed with 12 c.c. of a 5 per cent. solution of pure potassium chromate; after cooling and filtering, the filtrate is tested with 5 c.c. of a 10 per cent. solution of soda, which will reveal the presence of cinchoni-

dine, cinchonine, quinidine, or hydroquinine by the immediate formation of a precipitate or turbidity. The mixture is then again filtered, the filtrate freed from traces of these alkaloids by agitating first with 10 and then with 5 c.c. of chloroform, and after adding 2 grammes of ammonium chloride, it is again repeatedly shaken with chloroform which now dissolves the cupreine. On evaporating the solvent, the cupreine may be identified in the residue by the special tests for this base.

The original chromate method made no provision for the presence of cupreine sulphate in the quinine salt.

Reaction of Quinine Salts with Sodium Nitroprusside. J. G. Kramers. (*Ber. der deutsch. chem. Ges.*, 1896, 802, 803.) On adding sodium nitroprusside solution to a neutral solution of a quinine salt, a milky turbidity is produced, caused by the formation of small oily drops which are gradually converted into salmon-coloured needle-shaped crystals; these melt at 177–185° C. If the two solutions are mixed while warm, the mixture is at first clear, but the crystals appear after some time and increase in quantity as the liquid cools. They are soluble in ether and benzol, but only slightly soluble in cold alcohol; when dry, they are not affected by light, but in the nitroprusside solution they assume a blue colour on exposure to sunlight. The results of analyses agree with the formula—



Other cinchona alkaloids, with the exception of hydroquinine, yield no crystalline precipitates under the same conditions. The author therefore recommends this reaction as a test for the purity of quinine salts. For this purpose sufficient nitroprusside is used to effect complete precipitation of the quinine; after separating the liquid from the crystals by filtration, the filtrate should remain perfectly clear on the addition of a drop of ammonia. A turbidity thus produced indicates the presence of other cinchona alkaloids.

Micro-Chemical Distinction of Cinchonidine from Homocinchonidine. T. H. Behrens. (*Journ. Chem. Soc.*, from *Zeitschr. analyt. Chem.*, xxxv. 133–143.) Hesse, whilst maintaining the individuality of homocinchonidine against Skraup, Claus, and de Vrij, who regard it as impure cinchonidine, has published methods for the conversion of the one into the other. The author endeavours by microscopic methods to solve the question whether cinchonidine can, by the addition of other cinchona alkaloids, be

caused to assume the properties of homocinchonidine or the converse.

A 0.5 per cent. solution of the mixed hydrochlorides fractionally precipitated with sodium hydrogen carbonate deposits first the cinchonidine in groups of filiform needles with a marked tendency to ramify at the ends (difference from cinchonine crystals, which do not ramify). Homocinchonidine yields broad, six-sided plates, and large stellate groups with broad foliated rays. Another method consists in subliming the bases and warming the sublimates with water until crusts begin to form. The same difference is observed as in the sodium carbonate precipitate. Still more distinct are the forms of the platinochlorides:—Cinchonidine yields minute spheroids which are at first clear and structureless, but gradually become turbid with radial fibrous crystals which rarely extend beyond the edge of the spheroid. Homocinchonidine yields large radiating dendrites and rosettes. A similar and highly characteristic difference is observed between the acid hydriodides.

The general tendency of homocinchonidine salts seems to be to form larger crystals than those of cinchonidine. Addition of quinine to a small crystallising cinchonidine salt does not cause it to furnish the large crystals of homocinchonidine. Fractional sublimation of mixtures of quinine, quinidine, and cinchonidine never yielded the characteristic crystals of homocinchonidine. Mixtures of quinine, quinidine, and homocinchonidine fractionally precipitated by sodium hydrogen carbonate never yielded the radiating, thread-like crystals of cinchonidine. Hesse's methods for the conversion of one alkaloid into the other were repeated, but the characteristic crystalline forms of each substance were not affected. A great variety of specimens of commercial cinchonidine, homocinchonidine, and "quinetum" were examined by the fractionation methods and by precipitation with platinic chloride, and in all of them a proportion, frequently a preponderance, of the large, crystallising substance was found.

A plate of drawings of the microscopic crystals accompanies the paper.

Conversion of Cinchonine into Cinchonidine. W. Koenigs and A. Husmann. (*Ber. der deutsch. chem. Ges.*, 1896, 2185-2187.) When cinchonine is heated for many hours with a solution of potash in amyl alcohol, a small proportion of this alkaloid is converted into cinchonidine, while a much larger proportion is changed into bases which are soluble in ether. The formation of

cinchonidine from cinchonine under these conditions is regarded as confirmatory of the view that these bases are stereoisomerides. The cinchonine employed in the authors' experiments was perfectly free from cinchonidine.

Note on Caffeidine-Carbonic Acid. E. Fischer and O. Bromberg. (*Ber. der deutsch. chem. Ges.*, 1897, 219-221.) According to Maly and Andreasch (*Monatsh. Chem.*, iv. 369), caffeine is converted by cold dilute solutions of alkalies into caffeidine-carbonic acid, the aqueous solution of which is decomposed on heating into carbonic anhydride and Strecker's caffeidine. The authors of the present paper have endeavoured to reverse this action, but only with partial success. They find that caffeidine-carbonic acid can be re-converted into caffeine by heating with phosphorus oxychloride; but all attempts to introduce carbonic acid into caffeidine gave negative results.

Constitution of Caffeine, Xanthine, Hypoxanthine, and Allied Bases. E. Fischer. (*Journ. Chem. Soc.*, June, 1897, from *Ber. der deutsch. chem. Ges.*, 1897, 549-559.) In this paper, the author discusses the constitution of these bases, and considers that, owing to the large increase in the number of derivatives of xanthine and hypoxanthine, the old system of nomenclature is no longer applicable. In his opinion, it is most convenient to consider all these compounds as derivatives of purine ($C_5N_4H_4$), and to number the atoms

in its ring nucleus as follows:

$$\begin{array}{ccccccc} & 1 & 6 & 5 & 7 & & \\ & N & \cdot C & \cdot C & \cdot N & & \\ & | & & & & & \\ C & \cdot N & \cdot C & \cdot N & & & \\ & 2 & 3 & 4 & 8 & & \end{array} \bigg\rangle C^9.$$

Hypoxanthine is

thus 6-oxypurine; uric acid = 2:6:8-trioxypurine; caffeine = 1:3:7-trimethyl-2:6-dioxypurine; hydroxycaffeine = 1:3:7-trimethyl-2:6:8-trioxypurine; guanine = 2-amido-6-oxypurine; adenine = 6-amidopurine. The function of the oxygen atoms, whether hydroxylic or ketonic, is purposely not indicated in the names, owing to the possibility of tautomeric forms existing.

Perhaloids of Caffeine. M. Gomberg. (*Journ. Amer. Chem. Soc.*, xviii. 347-377.) The author describes a number of perhaloids of caffeine, and of chloro- and bromo-caffeine. His results lead to the conclusion that periodides of organic bases can be obtained, not only from the hydriodides of the latter, but also from their hydrobromides and hydrochlorides, and that alkaloids, which form periodides, will also yield the corresponding perbromides; further, that the stability of the perhaloids varies with

the more or less volatile nature of the halogen, and that the number of halogen atoms entering into the compound admits of no conclusion as to the strength of the base present.

Cuskygrine. C. Liebermann and G. Cybulski. (*Ber. der deutsch. chem. Ges.*, 1896, 2050, 2051.) The authors correct their previous statement that cuskygrine yields little or no hygric acid on oxidation with chromic acid. By modifying the conditions they have now obtained a good yield of the acid in this manner. Cuskygrine, like hygrine, is therefore a derivative of methylpyrrolidine.

Cuskygrine Hydrate. C. Liebermann and F. Giesel. (*Ber. der deutsch. chem. Ges.*, 1897, 1113-1115.) On adding 21.4 per cent. of water to anhydrous cuskygrine the oily liquid solidifies almost instantly to a crystalline mass, consisting of cuskygrine hydrate, $C_{13}H_{24}N_2O + 3\frac{1}{2}H_2O$. This hydrate crystallises in colourless needles melting at 40-41° C., and showing the same behaviour towards solvents as the anhydrous base, except that its solution in ether or benzol is turbid. The hydrate is capable of absorbing notable quantities of carbonic anhydride, the formation of a carbonate in this case being rendered possible by the water of crystallisation. No such combination takes place in the case of anhydrous cuskygrine which, as a tertiary base, is incapable of forming a salt by direct union with carbonic anhydride.

Pure Atropine. J. Gadamer. (*Archiv der Pharm.*, ccxxxiv. 543-551. From *Journ. Chem. Soc.*) The author has succeeded in preparing perfectly pure atropine by treating *Atropinum purissimum Merck* with moderately concentrated alcoholic soda for several months. After recrystallisation and repeated conversion into the sulphate and reconversion into the free base, absolutely pure atropine is obtained. In this form, it is optically inactive, and its salts are also quite devoid of optical activity. Atropine prepared in this way melts at 115.5-116°, the anhydrous sulphate melts at 180-181°, and the hydrated salt (1 H_2O) at 161°, or 151-154°, according to the rate at which it is heated. The oxalate melts at 188-188.5° and is anhydrous; Hesse gives the melting point as 176°. Hyoscyamine oxalate melts at 173° (176° Hesse). The author has obtained the *aurochloride* of a new alkaloid from crude duboisine, but this has not yet been completely analysed; it melts at 198° and forms characteristic spherical aggregates.

Tropinic Acid. G. L. Ciamician and P. Silber. (*Ber. der deutsch. chem. Ges.*, 1896, 1216-1218 and 2975, 2976.) On heating tropinic acid at 220° for 8 hours with hydriodic acid and phos-

phorus, a base is obtained which is probably a trialkylamine, formed by the complete decomposition of the tropinic acid molecule. It yields a yellow crystallisable aurochloride melting at 208–210° C.

Atroscine. O. Hesse. (*Ber. der deutsch. chem. Ges.*, xxix. 1781.) The author supports his own evidence in favour of the individuality of this base by publishing the results obtained with it by Königshöfer in its application in ophthalmic practice. According to these, atroscine is equal to hyoscine (scopolamine) or atropine in its dilating effect on the pupil, but exercises a much greater and more advantageous influence upon the power of accommodation. It is also found to have a stronger action on the ciliary muscles, and to be superior to other mydriatic alkaloids for allaying irritation. On the whole, it would appear from these experiments that the value of commercial salts of hyoscine or scopolamine for ophthalmic purposes is proportionate to the greater or less amount of atroscine contained in them, the presence of which is readily indicated by the diminished rotatory power.

Scopolamine. E. Schmidt. (*Ber. der deutsch. chem. Ges.*, 1896, 2009–2014.) The author reviews the discussion between O. Hesse and himself with reference to scopolamine (see *Year-Book of Pharmacy*, 1896, pp. 3 and 36–38), and again points out that the substance described by the former (Hesse) as atroscine most closely resembles the inactive modification of scopolamine (*i*-scopolamine) previously reported upon by him (Schmidt), which is formed by the action of alkalis on scopolamine hydrobromide, and appears to have the same physiological action as the optically active base. He intends to institute a further careful comparison of the two substances. Meanwhile he considers it desirable, in view of the fact that salts of reduced optical activity and corresponding to the formula $C_{17}H_{21}NO_4$, $HBr + H_2O$ are now occurring in commerce, that the name scopolamine should be retained for the normal base $C_{17}H_{21}NO_4$, the hydrobromide of which has a rotatory power of $\alpha_D = -25^\circ 43'$. The substitution of the name hyoscine for scopolamine, suggested by Hesse, is regarded by Schmidt as inexpedient, in view of the fact that this name is still generally associated with a supposed isomeride of atropine and hyoscyamine of the formula $C_{17}H_{23}NO_3$ (Ladenburg's hyoscine).

Scopolamine and *i*-Scopolamine. O. Hesse. (*Ber. der deutsch. chem. Ges.*, 1896, 2439–2442.) In reply to E. Schmidt (preceding abstract), the author again maintains that the base contained in

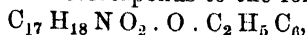
commercial scopolamine hydrobromide consists of hyoscyne and a variable proportion of atropine.

Note on Solnine. J. U. Lloyd. (*Amer. Journ. Pharm.*, 1897, 108.) The author has previously reported upon this alkaloid isolated by him from the root of *Solanum carolinense* (abstract, *Year-Book of Pharmacy*, 1894, 45). He has now determined the melting point of this base, which he finds to be 127.2°C ., while that of solanine is 235.0°C . A fresh supply of solnine is now in course of preparation for the purpose of determining its composition by combustions.

Note on some New Gold Salts of the Solanaceous Alkaloids. H. A. D. Jowett. (*Proc. Chem. Soc.*, No. 181, 136, 137.) When hyoscyne hydrobromide and auric chloride are mixed, either in concentrated, dilute, neutral or acid solution, a red precipitate is formed which can be crystallised from a hot aqueous solution acidulated with hydrochloric acid. On analysis, the salt is found to be an additive compound of auric chloride with hyoscyne hydrobromide $[\text{B} \cdot \text{H Br} \cdot \text{Au Cl}_3]$. When this experiment is conducted in the presence of a large excess of hydrobromic acid, a chocolate-coloured precipitate is formed which can be recrystallised from hot dilute hydrobromic acid and forms chocolate-coloured prisms, which, on analysis, prove to be the auribromide of the base $[\text{B} \cdot \text{H Br} \cdot \text{Au Br}_3]$. Even when excess of hydrochloric acid is present the aurichloride is not formed. The analogous compounds of hyoscyamine and atropine were formed by similar reactions and resemble the corresponding salts of hyoscyne in chemical and physical properties.

Experiments were made to determine whether the bromaurichloride of formula $\text{B} \cdot \text{H Br} \cdot \text{Au Cl}_3$ was an isomorphous mixture of aurichloride and auribromide, in view of the evidence adduced by Herty (*J. Am. C. S.*, xviii. 130) regarding the composition of the salt formed by mixing solutions of platonic chloride and potassium bromide ($\text{K}_2 \text{Pt Cl}_4 \text{Br}_2$). It was proved, however, that this view could not be adopted for the constitution of the gold salt, which must therefore be considered a true chemical compound.

Benzylmorphine. E. Merck. (*Pharm. Zeitung*, 1897, 448.) This preparation, which corresponds to the formula



has been obtained by the author in the action of benzyl chloride on morphine in the presence of alcohol and alkali. The resulting benzylmorphine is converted by the addition of hydrochloric acid into the difficultly soluble hydrochloride and isolated in this form.

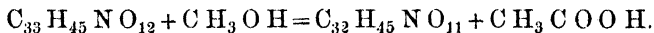
Benzylmorphine crystallises in large lustrous prisms or plates, which are readily soluble in alcohol, ether or benzol. It does not give the blue coloration with ferric chloride characteristic of morphine. This benzyl compound is stated to be superior for therapeutic purposes to codeine and other alkyl ethers of morphine on account of its greater activity. It is also found to be free from the unpleasant secondary effects peculiar to morphine.

Comparative Solubility of Morphine and Codeine in Anisol. L. Fouquet. (*Journ. de Pharm. et de Chim.* [6], v. 49.) The author found that cold anisol is a suitable solvent for separating codeine from morphine, since it readily dissolves the former without exercising any solvent action on the latter. His experiments were made with pure anisol, boiling at 150°C ., and having a specific gravity of 0.991. The following results show the relative solubility of the two bases at various temperatures:—

Temperature.	Morphine.	Codeine.
9° . . .	Insoluble	7.80 per 100, by weight.
16° . . .	„	15.28 „ „
32° . . .	„	„ „
100° . . .	0.95 per 100.	161.00 „ „
150° . . .	4.80 „	„ „

Further experiments proved that in a mixture of these two bases, a correct quantitative separation can be effected by means of this solvent. The author considers it probable that anisol may be applicable also in other cases as a solvent in toxicological investigations.

Action of Methyl Alcohol on Aconitine. Formation of Methyl Benzaconine. W. R. Dunstan, T. Tickle and D. H. Jackson. (*Proc. Chem. Soc.*, 1896, 159.) The authors state that when aconitine (or a salt) is heated with methyl alcohol in a closed tube, between 120° and 130° , the alkaloid loses one molecular proportion of acetic acid and takes up one methyl group, forming methyl benzaconine—



Methyl benzaconine is a well-crystallised base (melting point $210\text{--}211^{\circ}$ corr.), soluble in alcohol, ether and benzene, and most readily crystallised by adding light petroleum to its ethereal solution. It forms crystalline salts, the hydrochloride and the hydrobromide being examples. On hydrolysis, methyl benzaconine loses benzoic acid, forming a base which appears to be methyl aconine, but which needs to be more completely investigated.

Methyl benzaconine produces a well-marked physiological effect when administered to animals; but, unlike aconitine, it is not a powerful poison.

Atisine, the Alkaloid of *Aconitum Heterophyllum*. H. A. D. Jowett. (*Chem. News*, lxxiv. 120.) The author has investigated the nature and properties of the alkaloid contained in the roots of the non-toxic *Aconitum heterophyllum*. This alkaloid was examined by Broughton in 1873, who named it atisine, and ascribed to it the formula $C_{46}H_{74}N_2O_5$; it was subsequently examined by Wasowicz and by Alder Wright. The powdered roots were extracted by percolation with a mixture of methyl and amyl alcohol, and from this percolate was obtained the crystalline hydrochloride or hydriodide by the method described in the paper.

Atisine, for which the author adopts the formula $C_{22}H_{31}NO_2$, could only be obtained as a colourless varnish, soluble in alcohol, ether, or chloroform, slightly soluble in water, and insoluble in petroleum ether. Its alcoholic solution is laevorotatory, $[\alpha]_D = -19.6$, and though the base is amorphous it yields a series of crystalline salts.

Atisine hydrochloride, $C_{22}H_{31}NO_2 \cdot HCl$, crystallises either from water or from a mixture of alcohol and ether in well-defined prisms, which melt at 296° (corr.) and are freely soluble in water or alcohol, but insoluble in ether. The aqueous solution of the salt is dextrorotatory, $[\alpha]_D = +18.46^\circ$.

Atisine hydrobromide, $C_{22}H_{31}NO_2 \cdot HBr$, crystallises from water or a mixture of alcohol and ether, either singly or in rosettes of needles, which melt at 273° (corr.). The salt is freely soluble in water and alcohol, but insoluble in ether or petroleum ether, and in aqueous solution is dextrorotatory, $[\alpha]_D = +24.3^\circ$.

Atisine hydriodide, $C_{22}H_{31}NO_2 \cdot HI$, crystallises from hot water or alcohol in well-defined plates or tables, melting at $279\text{--}280^\circ$ (corr.), soluble in hot water or alcohol, but sparingly soluble in cold water. Its aqueous solution is dextrorotatory, $[\alpha]_D = +27.4^\circ$. This salt cannot apparently be prepared by the direct action of hydrogen iodide upon the base, but is easily prepared by precipitating a solution of any salt of atisine with potassio-mercuric iodide, and decomposing the precipitate with hydrogen sulphide.

The *nitrate* (m.p. 252° , corr.) and *platinichloride* (m.p. 229° , corr.) were also obtained as well-defined crystalline salts, but the *aurichloride* could only be obtained as an amorphous powder. The results of the analyses of a number of pure salts led to the adoption of the formula $C_{22}H_{31}NO_2$ for the base.

The hydriodide, when treated with hydrogen iodide, yielded no methyl iodide, and thus the alkaloid was shown to contain no methoxyl groups.

When either the base or its salts are mixed with alkalies or acids in either alcoholic or aqueous solution, no fission of the molecule takes place, but a new base, atisine monohydrate, $C_{22}H_{31}NO_2 \cdot H_2O$, is formed. Neither this base nor any of its salts could be obtained in the crystalline condition, but analyses of the *aurichloride* and *platinichloride* confirmed the formula given above.

A preliminary examination of the physiological action of the nitrate by Dr. Cash, F.R.S., showed that the alkaloid is non-toxic, and that its action somewhat resembles aconine.

Erythrophleïne. E. Harnack. (*Archiv der Pharm.*, cccxxiv. 561-570.) The author directs attention to several points of difference between the alkaloid erythrophleïne previously investigated by Zabrocki and himself (*Arch. exper. Path. Pharm.*, xv.), and the base contained in a sample of "erythrophleïne hydrochloride" prepared by Merck, which he has recently examined. He is unable to say, however, whether the alkaloid was in each case obtained from a bark of the same species (*Erythrophleum guineense*).

Pilocarpine and Pilocarpidine. A. Petit and M. Polonovski. (*Journ. de Pharm.* [6], 5, 475-482.) The authors point out that most of the commercial salts of pilocarpine are mixtures in variable proportions of pilocarpine and pilocarpidine salts. The proportion of pilocarpidine is most considerable in the nitrate, in which it is easily detected by its lowering effect on the melting point of the sample, pure pilocarpine nitrate melting at 177-178° C., while mixtures of the two nitrates fuse at a much lower temperature varying with the amount of the pilocarpidine salt present. The optical rotation also affords a satisfactory test for the detection of pilocarpidine and the approximate estimation of the relative proportion of the two bases in the nitrate under examination.

The authors disagree with the opinion expressed by Hardy and Calmels that pilocarpidine is a decomposition product of pilocarpine, and arrive at the conclusion that the former base, like the latter, pre-exists in the plant. A further chemical study of the two alkaloids leads to the inference that they are isomeric.

Pilocarpine. P. Knudsen. (*Ber. der deutsch. pharm. Ges.*, vi. 164.) The author has entirely failed to effect a synthesis of

pilocarpidine and of pilocarpine on the lines indicated by Hardy and Calmels, and arrives at the conclusion that the views of these chemists respecting the constitution of pilocarpine, according to which the molecule of this base is produced from trimethylamine and pyridine lactic acid, are erroneous. He considers that the work of these investigators on the alkaloids of jaborandi requires revision.

Beberine. M. Scholtz. (*Ber. der deutsch. chem. Ges.*, 1896, 2054-2058.) The most suitable solvent for obtaining this base in well-defined crystals is methyl alcohol. Such a solution readily yields small, colourless shining prisms melting at 214°C ., and having a composition represented by the formula $\text{C}_{18}\text{H}_{21}\text{NO}_3$, which agrees with that found by Bödeker and Flückiger. The amorphous alkaloid melts at 180° , and is very soluble in both ethyl and methyl alcohols, while the crystallised base only slightly dissolves in these on boiling. The crystals are freely soluble in acetone or chloroform, yielding solutions which, on evaporation, leave the alkaloid in the amorphous condition in which it again fuses at 180°C . The hydrochloride crystallises in minute needles melting at $259\text{--}260^{\circ}\text{C}$.

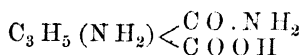
The Alkaloids of Corydalis Cava. E. A. Schmidt and H. Ziegenbein. (*Archiv der Pharm.*, cccxxiv. 482-537.) This paper supplies further chemical information respecting the alkaloids corydaline, corybulbine, bulbocapnine and corycavine. In agreement with Freund and Josephi, the authors find the formula of corydaline to be most probably $\text{C}_{22}\text{H}_{27}\text{NO}_4$, which differs from that proposed by Dobbie and Lauder ($\text{C}_{22}\text{H}_{29}\text{NO}_4$). Corydaline and corybulbine are found to behave towards iodine in a similar manner to canadine, while bulbocapnine shows a different behaviour in this respect, and corycavine does not seem to be affected by iodine. The last-named base appears to have the formula $\text{C}_{23}\text{H}_{23}\text{NO}_6$, and not $\text{C}_{23}\text{H}_{23}\text{NO}_5$ as stated by Freund and Josephi. For further details, the original paper should be consulted.

Sparteine. F. B. Ahrens. (*Ber. der deutsch. chem. Ges.*, 1897, 195-200.) Under the influence of oxidising agents sparteine yields a series of products, of which *oxysparteine*, $\text{C}_{15}\text{H}_{24}\text{N}_2\text{O}$, and *dioxysparteine*, $\text{C}_{15}\text{H}_{26}\text{N}_2\text{O}_2$, and some of their salts are described in the present paper.

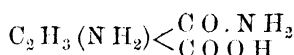
Arginine. (*Pharm. Journ.*, 4th series, iii. 378, from *Ber. der deutsch. chem. Ges.*, xxix. 352.) Arginine, $\text{C}_6\text{H}_{14}\text{N}_4\text{O}_2$, was obtained in the first instance by Hedin as one of the products

resulting from the action of hydrochloric acid upon protein substances. This base has since been detected in the blanched sprouts of *Lupinus luteus*, and is now found by Schulze to occur in the tubers and roots of various plants—*Brassica rapa*, *Helianthus tuberosus*, *Ptelea trifoliata*, etc.

Glutamine. E. Schulze. (*Ber. der deutsch. chem. Ges.*, 1896, 1882–1884. From *Pharm. Journ.*) Glutamine, $C_5H_{10}N_2O_3$, is a homologue of asparagine, $C_4H_8N_2O_3$, and was first isolated by Schulze and Bosshard (*Berichte*, xvi. 312) from beetroot juice in 1883. Subsequently it was obtained from the shoots of *Cucurbita pepo* and *Helianthus annuus*, and from the tubers of *Stachys tubrifera*. Glutamine crystallises in colourless needles: it is anhydrous, slightly soluble in cold water, readily soluble in hot water, and insoluble in alcohol. By heating with alkalis or baryta water it is decomposed with evolution of ammonia, and is converted into glutamic acid, $C_5H_9NO_4$: its constitution is probably analogous to that of asparagine—



Glutamine.



Asparagine.

As a result of further investigation, the author has found that glutamine is very widely distributed, and probably plays the same part as asparagine, which it appears to replace in some instances. The method of extraction consists in first purifying the plant juice by means of basic lead acetate, then precipitating with mercuric nitrate. The precipitate, containing a mercury compound of glutamine, is decomposed with sulphuretted hydrogen, and the clear filtered liquid evaporated until it crystallises. Sometimes the glutamine thus obtained is accompanied by asparagine, tyrosine, or arginine. From tyrosine it may be separated by its greater solubility in water; arginine may be precipitated by phosphotungstic acid; while the crystals of asparagine, being more compact, can be mechanically separated from the lighter needles of glutamine. Glutamine has been found in many of the *Cruciferae* and *Caryophyllaceae*, in ferns, and in the shoots of *Picea excelsa*. A number of other plants are being examined by the author in the Agricultural Laboratory at Zurich.

Stereoisomeric Coniines. R. Wolffenstein. (*Journ. Chem. Soc.*, from *Ber. der deutsch. chem. Ges.*, 1896, 1956–1959.) γ -Coniine, which is obtained along with coniine from *Conium maculatum*, yields the latter base on reduction with sodium and ethylic

alcohol; the modification, however, is optically inactive, and thus a convenient means is afforded of obtaining *i*-coniine.

Ladenburg's isoconiine was stated to form a dimorphous platinochloride, the modifications melting at 175° and 160° respectively; the author has previously shown that the former salt is *d*-coniine platinochloride, and the present communication establishes the identity of the form which melts at 160° with the platinochloride of *i*-coniine. This salt forms bright red, monoclinic crystals, and the axial angle is $64^{\circ} 30'$; a parallel crystallographic examination of the platinochlorides from both sources has placed their identity beyond question.

Isoconiine, therefore, is a mixture of dextrorotatory coniine with the inactive modification.

Stearates of the Alkaloids and their Therapeutic Application. F. Zanardi. (*Chem. Centr.*, 1896, 765.) *Morphine stearate*, $C_{17}H_{35}NO_3$, $C_{17}H_{35} \cdot COOH$, prepared by slowly adding morphine to an alcoholic solution of stearic acid, forms crystals which can be dried at $30-40^{\circ}$. It is also obtained on mixing aqueous solutions of sodium stearate and morphine hydrochloride, as a voluminous mass which, on recrystallisation from alcohol, forms white, pearly scales melting at $84-86^{\circ}$. It is easily soluble in hot alcohol, slightly so in ether and in cold alcohol, and also in oils to the extent of about 1 per cent., and in fats and vaselin.

Atropine stearate, $C_{17}H_{23}NO_3$, $C_{17}H_{35} \cdot COOH$, which is prepared in a similar way to the morphine salt and resembles it also as regards solubility, crystallises in white, pearly needles, and melts at 120° . A solution of 0.1 gramme in 50 grammes of almond oil is a suitable substitute for the oils of henbane and belladonna.

Cocaine stearate, $C_{17}H_{21}NO_4$, $C_{17}H_{35} \cdot COOH$, is prepared in a similar manner to the preceding salts, and resembles them as regards solubility. It crystallises in white needles, and melts at about 90° .

Gelseminine. M. Göldner. (*Ber. pharm. Ges.*, v. 330-359.) The author has repeated Spiegel's work on this base, and confirms his results. A number of derivatives and decomposition products of this alkaloid are described in this paper.

Gelsemic Acid. V. Coblentz. (*Amer. Journ. Pharm.*, 1897, 228-231.) The statement of C. Robbins that gelsemic acid is identical with æsculin has been already disputed by Wormley (*Amer. Journ. Pharm.*, 1872). It is now further disproved by the author of the present paper, who shows that while the melting points of gelsemic acid, its acetyl compound and its bromo-

derivative are 206° , 108° , and 250° C. respectively, those of *æsculin* and its acetyl- and bromo-derivative are 160° , 130° , and 194° C. respectively. The formula given by Robbins is found to be incorrect, and is regarded as the result of incomplete combustions.

Cardol. L. Spiegel and C. Dobrin. (*Chem. Centr.*, 1896, 112.) The authors' results show that there is no relationship whatever between cardol and cantharidin, and that the cantharidin-like effects of *acajou* balsam are due to a substance which is soluble in ether, and not to cardol itself. The composition of cardol corresponds with the formula $C_{32}H_{50}O_3$.

Digitoxin. H. Kiliani. (*Archiv der Pharm.*, cccxxiv. 481-489.) The substance previously described by the author as β -digitoxin (abstract, *Year-Book of Pharmacy*, 1896, 49) is now definitely proved to be identical in all respects with Schmiedeberg's digitoxin. The supposed difference in the composition of the two has been found to be due to the difficulty with which digitoxin undergoes complete combustion. This principle occurs in foxglove leaves, but not in the seeds. Its correct formula is $C_{31}H_{50}O_{10}$.

Reactions of Digitalin. C. C. Keller. (*Chem. Centr.*, 1896, 132.) The author describes the following delicate colour reactions for digitonin, digitalin, digitalein, and digitoxin, the four active constituents of commercial digitalin.

The sample is dissolved in 3-4 c.c. of glacial acetic acid, a drop of dilute ferric chloride is added, and then an equal bulk of sulphuric acid, without shaking. The colour generated at the place where the two layers touch is carefully observed. Digitonin gives a faint rose-red, evanescent colour. Digitalin gives a bright carmine-red colour, very permanent, still visible with 0.05 milligram per c.c. Digitalein gives a similar colour, but less distinct and not so permanent. The test with digitoxin is very characteristic. The result is a dirty bluish-green ring, which soon breaks up into two layers, the lower of which is brownish-red, whilst the upper one assumes an indigo-blue colour.

The Tannin of Hops. J. Heron. (*Journ. Fed. Inst. Brewing*, 1896, 162-180; *Journ. Chem. Soc.*, 1897, 185, 186.) Attention is called in this paper to the disappearance of tannin which occurs during the storage of hops. One sample, which in 1883 contained 6.2 per cent. of tannin, in 1891 contained only 1.3 per cent. In some cases, after the lapse of four years, the tannin had entirely disappeared. It is considered probable that phlobaphen (the condensation product of hop tannin described by Etti) is first formed, and that this undergoes oxidation to some substance allied

to gallic acid, and that finally compounds are formed which are not acted on by the potassium permanganate solution employed in the determination. The greater part of the change takes place during the first year of storage.

The author finds that, contrary to general opinion, the hop tannin does not cause the precipitation of proteid substances from the wort during the boiling in the copper, but is of opinion that combination between certain nitrogenous constituents of the wort and the tannin occurs, resulting in the formation of a soluble substance, *tanno-peptone*, which is readily soluble in solutions of organic acids, and which resembles peptone in its general properties. Samples of hops rich in tannin were also found to be rich in those resins and bitter substances which are of value to the brewer.

Anemonin. H. Meyer. (*Monatshefte*, xvii. 283, 299.) Anemonin, $C_{10}H_8O_4$, is shown to be the anhydride of a dicarboxylic (ketonic) acid, and yields succinic and oxalic acids by oxidation. The author gives a summary of the present state of chemical knowledge of this substance, deducible from his own results and those of Beckurts, for which reference should be made to the original paper.

Leucotin. G. B. Negri. (*Chem. Centr.*, 1896, 311, 312.) The author confirms the supposition expressed by Ciamician and Silber that the leucotin of Jobst and Hesse is a mixture of methylprotocotoïn and methylhydrocotoïn.

Phenylcoumalin. O. Hesse. (*Ber. der deutsch. chem. Ges.*, 1896, 2322, 2323.) The author asserts the correctness of the melting point ($61-62^\circ C.$) previously found by him for phenylcoumalin, and considers the higher number (68° given by Ciamician and Silber) as erroneous.

Phenylcoumalin. G. Ciamician and P. Silber. (*Ber. der deutsch. chem. Ges.*, 1896, 2659-2662.) In reply to O. Hesse (preceding abstract) the authors reaffirm the accuracy of their previous statement that the melting point of pure phenylcoumalin is $68^\circ C.$ They do not consider the methods employed by Hesse for establishing the purity of the substance examined by him as entirely satisfactory.

Vicin. C. H. L. Ritthausen. (*Ber. der deutsch. chem. Ges.*, 1896, 2108, 2109.) A further investigation of vicin, a constituent isolated by the author from sow-beans (*Vicia faba minor*) and from vetches (*Vicia sativa*), proves that this substance is a glucoside, and not an alkaloid as supposed by Beilstein. On hydrolysis

with dilute sulphuric acid it yields divicin and a mixture of glucose and galactose.

Alloxantin from Convicin. C. H. L. Ritthausen. (*Ber. der deutsch. chem. Ges.*, 1896, 2106, 2107.) Alloxantin obtained as a decomposition product from convicin occurring in sow-beans and vetches (*Year-Book of Pharmacy*, 1896, 53), has been further investigated by the author with regard to its reactions. His results fully establish the identity of this body with alloxantin obtained in the oxidation of uric acid.

Luteolin. J. Herzig. (*Ber. der deutsch. chem. Ges.*, 1896, 1013, 1014.) Compare also A. G. Perkin, *Year-Book of Pharmacy*, 1896, 54. Luteolin, the yellow colouring matter of weld (*Reseda luteola*), is neither identical with nor closely related to fisetin ($C_{15}H_{10}O_6$), but seems to manifest some near relationship to chrysin.

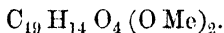
Yellow Colouring Matters in the Wallflower and White Hawthorn. A. G. Perkin and J. J. Hummel. Abstract of a paper read before the Chemical Society (*Journ. Chem. Soc.*, December, 1896, 1556-1572.) The authors have extracted from the yellow wallflower (*Cheiranthus cheiri*) a colouring matter, which proves to be a new quercetin monomethyl ether, $C_{16}H_{12}O_7$, for which they propose the name *isorhamnetin*, to distinguish it from the rhamnetin of Persian berries.

From white hawthorn flowers they have isolated a colouring matter identical with *quercetin*.

Quercetin Derivatives. J. Herzig. (*Monatshefte*, 1896, 421-428.) The derivatives described in this paper are tetracetyl-luteolin, triethyl-luteolin and *fisetinsulphonic acid*. For particulars, reference should be made to the original.

Occurrence of Quercetin in the Outer Skins of the Bulb of the Onion (*Allium Cepa*). A. G. Perkin and J. J. Hummel. (*Journ. Chem. Soc.*, August, 1896, 1295-1298.) The authors have isolated and examined the colouring matter contained in onion peel, and have established its identity with quercetin.

Curcumin. G. Ciamician and P. Silber. (*Ber. der deutsch. chem. Ges.*, 1897, 192-195.) Curcumin, when completely purified, melts at $183^{\circ}C$., and corresponds to the formula—



These numbers differ from those given by previous investigators. The diacetate and several derivatives of curcumin are described in this paper.

Acid Compounds of Natural Yellow Colouring Matters. A. G. Perkin. (*Proc. Chem. Soc.*, No. 169.) In a previous communication by Perkin and Pate (*Proc. Chem. Soc.*, 1895, 11, 126), it was shown that when treated with mineral acids in the presence of acetic acid, quercetin, rhamnetin, rhamnazin, fisetin; and morin, yielded crystalline compounds, the formula of which is generally represented as an addition product of one molecule of acid to one molecule of colouring matter. It has since been shown that luteolin and myricetin behave similarly, and it is most probable that all these colouring matters belong to the so-called quercetin group. In this paper certain of these compounds not previously examined are described, viz., Quercetin hydrochloride, $C_{15}H_{10}O_7 \cdot HCl$; morin hydriodide, $C_{15}H_{10}O_7 \cdot HI$; and luteolin hydriodide, $C_{15}H_{10}O_6 \cdot HI$. It is also shown that whereas quercetin tetramethyl ether resembles the monomethyl ether of rhamnetin in reacting with sulphuric acid, and not with the haloid acids, dibromo-quercetin and tetrabromo-morin yield no compounds with mineral acids. The other known members of the quercetin series are dioxylavone (Friedländer and Rudt, *Ber.*, 1896, 878) and chrysin, the colouring matter of poplar buds. The former has been shown by its discoverers to yield acid compounds, but, on examination, the latter was found to be devoid of this property. Various members of the ketone group (gallacetophenone, alizarine, and maclurin), of the xanthone group (gentisin, euxanthone, datiscetin), and of the anthraquinone group, were examined in this respect, but yielded no compounds with mineral acids. Catechin and kinoin also, the latter a constituent of Malabar kino, did not react.

For the constitution of the acid compounds two schemes are put forward, the first a similar one to that suggested by Nietzki and Schröber (*Ber.*, 1895, 50) for the phthaleine salts, and a second depending upon the saturation of the ethylene bond in the γ -pyrone ring.

It is considered probable that this reaction is characteristic of the quercetin group, and will thus be of service for distinguishing its members from the other classes of non-nitrogenous, yellow, mordant dye-stuffs which are at present known to exist.

Constituents of Bilberry Juice. W. Nacken. (*Journ. Chem. Soc.*, from *Forsch. Ber. Lebens. Hyg.*, ii. 350-361.) The colouring matter is best isolated by treating the juice, which has been previously nearly neutralised with soda, with hide powder. The hide powder takes up the colouring matter from the juice in the

course of two days, and is then collected and well washed with water; the colouring matter is extracted with dilute hydrochloric acid, and may be precipitated from the solution by dilute soda. When moist, it forms an indigo-blue paste, but when dry, a bluish-black mass with a reddish lustre. It dissolves in mineral and organic acids, but is insoluble in water, alcohol, ether, chloroform, or benzene. The solution changes to dark brown when treated with ferric chloride, to violet with copper sulphate or zinc chloride, and to indigo-blue with lead acetate. It reduces Fehling's solution, and is decomposed by hot concentrated sulphuric acid, a compound, $C_{14}H_{14}O_7$, being thrown down when the dark-red solution thus obtained is diluted with water. Nitric acid oxidises the colouring matter to picric and oxalic acids. It slowly decomposes on standing; and its acid solution, when boiled, evolves 4.9 per cent. of carbonic anhydride; it apparently has the composition $C_{10}H_{12}O_8$.

Considerable quantities of citric and malic acids are present in the juice, but no tartaric or oxalic acid. The carbohydrates present include glucoses, pentoses, and inositol.

The fermentation products of the juice include aldehyde, and capric, propionic, valeric, and butyric acids.

Preliminary Note on the Colouring Matter of Cochineal. C. Liebermann and H. Voswinckel. (*Ber. der deutsch. chem. Ges.*, 1897, 688-691.) The authors are engaged in an investigation of the oxidation of this colouring matter by means of persulphates. They have selected the latter in preference to the more energetic oxidising agents previously employed (such as nitric acid, bromine, etc.), in order to avoid the risk of obtaining products contaminated with derivatives. In the preliminary notice now published they give a short account of two products thus far obtained, viz., *cochinillic acid* ($C_{10}H_8O_7$?), and *coccinic acid* ($C_9H_8O_5$?), melting respectively at 224-225° and 293° C., and differing greatly in their relative solubilities.

Chlorophyll. E. Schunck and L. Marchlewski. (*Ber. der deutsch. chem. Ges.*, 1896, 1347-1352.) The authors give an account of the present state of chemical knowledge of chlorophyll. By the action of hydrochloric acid, chlorophyll yields phyloxanthin, and this, by the further action of the acid, is converted into phyllocyanin; chlorophyll shows two absorption bands, phyloxanthin four, and phyllocyanin five. It has been found, not only in this case, but with all other chlorophyll derivatives, that the number of absorption bands increases as the chlorophyll

complex is resolved. Tschirch regards phylloxanthin as a derivative of phyllocyanin; that this is incorrect is readily proved by shaking an ethereal solution of the former with hydrochloric acid, when it is quickly changed into the latter. The authors suggest that Tschirch's "phyllocyanic acid" is really impure phyllocyanin, as the absorption spectra are almost identical. "Phylloporpuric acid," which he obtained by heating alkachlorophyll with alkali, is a mixture, one constituent being phylloporphyrin, $C_{16}H_{18}N_2O$, which is closely related to hæmatoporphyrin, $C_{16}H_{18}N_2O_3$, both in composition and in spectroscopic properties; these are best observed in ethereal, not in alcoholic, solution. An important step in the investigation of the constitution of chlorophyll was made when it was recognised as a pyrroline derivative.

Turmerol. C. L. Jackson and W. H. Warren. (*Amer. Chem. Journ.*, xviii. 111-117.) This body was obtained by distillation (in vacuo) from an oil extracted from turmeric. It is a pale yellow oily liquid, which boils at $158-163^\circ C$. and corresponds to the formula $C_{13}H_{18}O$ or $C_{14}H_{20}O$. On oxidation with nitric acid it yields *p*-toluyllic acid, while oxidation with potassium bichromate leads to the formation of terephthalic acid.

Terpenes and Essential Oils. O. Wallach. (*Liebig's Annalen*, ccxci. 342-367.) The author publishes new methods for the preparation of terpinolene and dipentene. The former of these substances is produced when terpineol is slightly heated with an equal weight of formic acid. Dipentene is obtained by heating crystallised terpineol with an equal weight of water at $250^\circ C$. for six hours. The bulk of the present paper deals with oxidation products of terpineol, with the conversion of terpineol into carvone, and with new compounds of the pinol series. For particulars, reference should be made to the original.

Extraction of Terpenic Alcohols from Essential Oils. A. Haller (*Comptes Rendus*, ccxii. 865-869. From *Journ. Chem. Soc.*) In order to extract the terpenic alcohols which exist in essential oils either in the free state or in the form of ethereal salts, advantage may be taken of the ease with which they combine with the anhydrides of certain dibasic acids, and the tendency of the ethereal salts to decompose. Two methods of treatment are available, but in either case the ethereal salts must first be decomposed by means of alcoholic potash, and the product dried over anhydrous sodium sulphate.

In the first method, the essential oil is heated with the calculated quantity of succinic or phthalic anhydride, either alone

or in presence of a hydrocarbon, so that an ethereal hydrogen salt is formed. The product is extracted with a concentrated solution of sodium carbonate, and the alkaline liquid, previously exhausted with ether, is heated on a water-bath with excess of sodium hydrate until no more oil is liberated. Another plan is to acidify the alkaline liquid and separate the ethereal hydrogen salt. In either case, the product is treated with alcoholic potash, and the oil thus separated is dried and purified by fractionation.

The second method is applicable to alcohols which would be dehydrated by the acid anhydrides. The dried oil is dissolved in ether or benzene, mixed with a quantity of sodium corresponding with the quantity of alcohol present, and, after removal of any unattacked metal, a quantity of succinic or phthalic anhydride, corresponding with the sodium dissolved, is added. When the action is complete the product is treated with water, and the undissolved oil washed with a dilute solution of an alkali; the aqueous solutions are washed with ether, and treated as in the first method. Before applying the second method, any aldehydes must be removed, or they will be reduced by the action of the sodium.

Experiments with several varieties of oil of geranium, oil of peppermint, and oil of spike show that the methods give a good yield of the alcohols present.

Some New Derivatives of Terpeneol. H. V. Arny. (*Amer. Journ. Pharm.*, August, 1896, from the author's Inaugural Dissertation, *Göttingen*, 1896.) The author's investigation leads to the following conclusions:—

1. Terpeneol gives, with both primary and secondary amines of the fatty and aromatic series, well-characterized nitrolamines.

2. Terpeneolnitrosochloride, by the action of zinc dust and glacial acetic acid, is reconverted into terpeneol.

3. Terpeneolnitrosochloride gives, on treatment with sodium alcoholate, an oxyoxime, $C_{10}H_{15}OHNOH$.

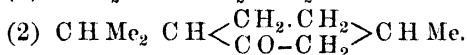
4. This oxyoxime is convertible, by dilute sulphuric acid, directly into carvon.

5. This conversion establishes the near relation of terpeneol to the carvon series.

6. The oxyoxime, like carvoxime, yields with concentrated sulphuric acid, paraamidothymol.

Rhodinaldehyde and its Conversion into Menthone. P. Barbier and L. Bouveault. (*Comptes Rendus*, cxxii. 737-739.)

From *Journ. Chem. Soc.*) When rhodinol is oxidised with chromic mixture, the product is a mixture of rhodinaldehyde and menthone. The semicarbazone of the former is soluble in ether, melts at 115° , and is not affected by hydrochloric acid, whilst that of the latter is insoluble in ether, and is decomposed by hydrochloric acid. The spontaneous oxidation of oil of pelargonium yields a similar mixture of rhodinaldehyde and menthone, and not a mixture of two ketones as stated in a former paper. The same mixture is obtained by the spontaneous oxidation of rhodinol, and the menthone results from an isomeric change in the rhodinaldehyde. If the oxime of a mixture of rhodinaldehyde and menthone is treated with acetic anhydride, it is completely converted into the oxime of menthone. It follows that rhodinaldehyde has the constitution (1) and menthone the constitution (2):—



Citronellaldehyde and Rhodinaldehyde. P. Barbier and L. Bouveault. (*Comptes Rendus*, cxxii. 795, 796.) The results of an investigation of various derivatives and oxidation products of these bodies lead to the conclusion that citronellaldehyde, obtained from "essence of citronelle," is isomeric with rhodinaldehyde.

Constitution of Licareol and Licarhodol. P. Barbier and L. Bouveault. (*Comptes Rendus*, cxxii. 842-844.) The authors have further investigated this subject, and arrive at the conclusion that the constitution previously ascribed by them to licareol (see *Year-Book of Pharmacy*, 1895, 67, 68) is not correct; and taking into consideration the close connection between licareol and licarhodol on the one hand, and geranaldehyde and methylheptenone on the other, they now provisionally adopt the constitution $\text{C Me}_2 \cdot \text{CH} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH Me} \cdot \text{C}(\text{OH}) \cdot \text{CH}_2$ for licareol, and $\text{C Me}_2 \cdot \text{CH} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH Me} \cdot \text{CH} \cdot \text{CH} \cdot \text{OH}$ for licarhodol.

Action of Hydrochloric Acid on Licareol, Licarhodol, and Lemonol. P. Barbier and L. Bouveault. (*Bull. Soc. Chim.*, [3], xv. 594-597.) The action of hydrochloric acid gas on lemonol gives rise to the formation of a colourless oil of the composition $\text{C}_{10}\text{H}_{18}\text{Cl}_2$, which boils at $120-125^{\circ}$, and yields on treatment with potassium acetate a mixture of terpenes (b.p. $170-180^{\circ}$) and the acetic ester of lemonol. Thus it appears that the reaction with hydrochloric acid leads to the formation of two chloro-derivatives, one of which yields with potassium acetate lemonyl acetate, while

the other yields a mixture of terpenes. The reaction between licareol and hydrochloric acid gives rise to the formation of a product identical with the above, capable of yielding lemonyl acetate; and the same product can also be obtained from licarhodol.

Apiol from Oil of Dill. G. L. Ciamician and P. Silber. (*Ber. der deutsch. chem. Ges.*, xxix. 1799-1811.) The authors have isolated from oil of dill (*Anethum graveolens*) a new apiol, which boils at 285°C ., is not crystallisable and differs from the apiol of parsley in the position of the methylene relative to the methoxy-groups. In other respects it agrees with the corresponding product from parsley in having the same composition ($\text{C}_{12}\text{H}_{14}\text{O}_4$), and in yielding a crystalline isoapiol on treatment with sodium ethylate. This isoapiol fuses at 44° and boils at 296°C .

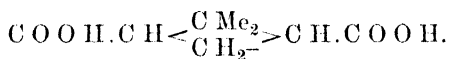
Anethol. E. Grimaux. (*Bull. Soc. Chim.* [3], xv. 778, 779.) When anethol is saturated with hydrochloric acid gas and distilled, the distillate contains, in addition to isanethol (described by Kraut), a second polymeride, *metanethol*, which melts at 132°C . The melting point of anethol is lowered after prolonged heating of the substance at 100°C ., owing to the formation of polymerides.

Action of Hydrobromic Acid on Eugenol. C. Moureu. (*Bull. Soc. Chim.* [3], xv. 983.) When hydrogen bromide is passed through eugenol in the presence of water, methyl bromide is liberated, and the solution yields a compound of the formula $\text{C}_9\text{H}_{12}\text{O}_2$, which is probably an oxypyropylypyrocatechin.

Menthene and Tertiary Menthol. L. Masson and A. Reyckler. (*Ber. der deutsch. chem. Ges.*, 1896, No. 12, 1843-1845.) The authors have prepared menthene by heating menthyl chloride (obtained from *l*-menthol) with a hot phenol solution of potash for 12 minutes at 150°C ., and then distilling the product. Tertiary menthol is produced from menthene by heating the latter with trichloroacetic acid at 70 - 90°C . for half an hour, and then agitating the product with potash for 12 hours.

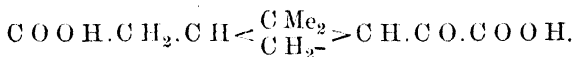
Preparation of Borneol from Synthetic Pinene. J. W. Schempf. (*Amer. Journ. Pharm.*, September, 1896.) After detailing the work of Bertram and others in this line of investigation, the author gives the result of his own study of the action of Bertram's reagent (acetic acid and 50 per cent. sulphuric acid) on synthetic pinene. He succeeded in separating considerable quantities of borneol, one product having a melting-point of 198° to 199° , and another melting at 195° to 197° . The product in both cases was optically inactive.

Pinic Acid. A. v. Baeyer. (*Ber. der deutsch. chem. Ges.*, xxix. 1907-1922.) Pinic acid is shown to contain the group CH_2COOH by bromination, conversion of the bromo-acid into hydroxypinic acid, elimination of carbonic anhydride, and oxidation of the resulting aldehyde to *norpic* acid by treating its alkaline solution with a 4 per cent. solution of potassium permanganate. This acid crystallises from ether in large prisms, and is probably identical with the acid $\text{C}_8\text{H}_{12}\text{O}_4$, obtained by Wagner and Ertchikowsky, on treating pinonic acid with an alkaline hypobromite. Its composition is represented by the formula—



In its behaviour towards copper acetate, *norpic* acid resembles pinic acid, whereas the α -pinonic acid yields bluish-green needles on warming the moderately concentrated solution; the *silver* salt crystallises in needles. Boiling acetic chloride does not convert *norpic* acid into an anhydride, and its stability towards oxidising agents is as marked as that of pinic acid.

When pinene is oxidised under slightly modified conditions, there is produced along with α -pinonic acid a dibasic ketonic acid, derived from the monobasic acid by oxidation of the methylic group attached to the carbonyl radicle; it is named *pinonylformic acid*, and is represented by the formula



It yields pinic acid on oxidation, whilst hot dilute sulphuric acid converts it into a lactonic acid, bearing to the lactonic isomeride of α -pinonic acid the relation in which an α -ketonic acid stands to a methyl ketone.

Pine-Resin Acids. E. Rimbach. (*Ber. der pharm. Ges.*, vi. 61-64.) On examining the crystals formed on adding water to an alcoholic solution of American colophony, the author found that they were not levorotatory like abietic acid, but strongly dextrorotatory. By recrystallisation from various solvents, conversion of the acid into the insoluble sodium salt, and recrystallisation of this salt, a product was obtained which, on being decomposed by hydrochloric acid, yielded crystals of a constant specific rotatory power, $[\alpha]_D = +73.36^\circ$ in chloroform solution, and melting at $210-211^\circ$; this acid was identical with Vesterberg's dextropimaric acid. The molecular weight agreed with the

formula $C_{20}H_{20}O_2$. From these facts it is evident that American colophony may contain, not only abietic acid, but also considerable quantities of dextropimaric acid. In the above case, the latter was accompanied by small quantities of the former. The usual assumption that abietic and dextropimaric acids are characteristic of certain individual resins must therefore be discarded, and an interchangeable occurrence regarded as more probable.

Cerotic and Melissic Acids. T. Marie. (*Ann. Chim. Phys.* [7], vii. 145-250; and *Bull. Soc. Chim.* [3], xv. 565-590.) The author has shown that the substance hitherto known as cerotic acid is a mixture of two distinct acids, one of which has the composition $C_{30}H_{60}O_2$, and is identical with melissic acid obtained from myricyl alcohol, while the other, for which the name *cerotic acid* is retained, has the composition $C_{25}H_{50}O_2$. Pure cerotic acid melts at $77.9^\circ C.$; melissic acid at $90.6^\circ C.$; the latter is almost insoluble in warm methyl alcohol and ether, in which cerotic acid is soluble. On treatment with hydriodic acid and red phosphorus, cerotic acid yields a hydrocarbon of the formula $C_{25}H_{52}$, melting at $53-53.5^\circ C.$ The author describes several salts, ethers, mono-, di-, and tri-glycerides, chlorides, amides, and nitriles of both acids; also bromo-, oxy-, and amido-derivatives.

Melissic acid obtained from beeswax is identical with that prepared from carnauba wax.

Rapic Acid. J. Zellner. (*Monatshefte*, xvii. 309-313.) The author questions the accuracy of the formula $C_{18}H_{34}O_2$ assigned to this acid by Reimer and Will. Analyses of the zinc salt and other considerations discussed in the paper confirm the view that the formula for this acid is $C_{18}H_{34}O_2$. Rapic acid, however, does not give the elaidin reaction, and is therefore not identical with oleic acid.

Development of Rancidity in Fats. E. Spaeth. (*Zeitschr. für analyt. Chem.*, xxxv. 471-493; *Journ. Chem. Soc.*, December, 1896, 664, 665.) The researches of Duclaux, Ritsert, and von Klecki have proved that the development of rancidity in fats is due to atmospheric oxidation, and that it is favoured by access of light. In order to elucidate more fully the nature of the changes, the author has examined fourteen samples of lard which had been kept for three years in loosely corked flasks. He arrives at the following conclusions:—In the first place, the glycerides, both of the saturated and unsaturated fatty acids, split up into glycerol and the free acids. The unsaturated acids (mainly oleic) then further decompose into acids containing fewer carbon atoms,

together with (as shown by von Raumer) aldehydes; hydroxy-fatty acids are at the same time formed. Simultaneously, the unsaturated acids undergo polymerisation, but the polymerides split up again into the simpler acids when saponified.

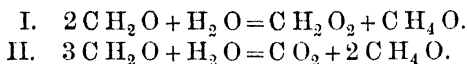
Some Results Obtained in the Destructive Distillation of Linseed Oil. S. P. Sadtler. (*Amer. Journ. Pharm.*, September, 1896, 465-467.) The author has observed that among the products obtained in the destructive distillation of linseed oil under pressure, there are hydrocarbon oils analogous to the mineral oils of natural petroleum. The highest of the fractions obtained by him separated scale paraffin on standing. A residue was left after the distillation, which was similar to that obtained in petroleum distillation. In 1888 and 1889 Engler obtained similar results in the distillation of a fish oil under pressure; and on the strength of his observations propounded a theory that animal remains seem to be indicated as the main source of the formation of petroleum deposits (*Ber. der deutsch. chem. Ges.*, xxi. 1816, xxii. 592). The view then expressed by him (Engler) was that, while the nitrogenous tissue of these animal deposits has disappeared as the most readily alterable portion, the fatty tissues have undergone a slow destructive distillation under pressure with the formation of petroleum oils. In the light of his own results above referred to, the author of the present paper considers that Engler's theory should be widened so as to include the vegetable seed oils as probable additional sources of petroleum formation.

Composition of Wool-Fat. L. Darmstaedter and I. Lifschütz. (*Ber. der deutsch. chem. Ges.*, 1896, xxix. 2890-2900; and *Pharm. Zeitung*, xlii. 123.) Compare also *Year-Book of Pharmacy*, 1896, 29. In addition to myristic and carnaubic acids previously referred to, the authors have isolated three new acids, of which only two, viz., *lanoceric acid*, $C_{30}H_6O_4$, and *lanopalmitic acid*, $C_{16}H_{32}O_3$, have as yet been examined. The former of these melts at 103-104° C., the latter at 87-88° C. The neutral alcohols from wool-fat have also been further examined, of which *ceryl alcohol*, $C_{27}H_{56}O$, and *carnaubyl alcohol*, $C_{24}H_{50}O$, are described in this paper. The presence of cholesterol has also been recognised.

Oxidation Products of Cholesterin. J. Mauthner and W. Suida. (*Monatsh.*, xvii. 579-603.) The authors have investigated the action of a solution of chromic acid in glacial acetic acid on cholesterin, and report upon the following products obtained in this oxidation: α -*Oxycholestenol*, $C_{27}H_{42}O_2$; *oxycholestenone*,

$C_{27}H_{40}O_2$; and *oxycholestendiol*, $C_{27}H_{42}O_3$. For details, reference should be made to the above source, or to *Ber. der deutsch. chem. Ges.*, 1896, 906-908.

Action of Water on Formaldehyde and the Part played by Formaldehyde in Plants. S. Delépine. (*Comptes Rendus*, cxxiii. 120-122.) On heating formaldehyde with an equal weight of water in a sealed tube at $130-140^\circ C$. for six hours, carbon dioxide is evolved, and the fluid contents of the tube have an acid reaction and an ethereal odour. If the heat be raised to $200^\circ C$., the following reactions occur:—



At the same time a small quantity of carbonic oxide is produced, the formation of which is due to the decomposing action of the hot steam on the formic acid. These reactions appear interesting in view of the fact that formaldehyde is the first assimilation product of carbon in plants containing chlorophyll, and on account of the possibility that similar reactions may take place in the living plant at an ordinary temperature. The occurrence of methyl alcohol and of free formic acid in plants might be accounted for in such a manner.

Physiological Significance of Lecithin in Plants. J. Stoklasa. (*Journ. Chem. Soc.*, from *Ber. der deutsch. chem. Ges.*, xxix. 2761-2771.) The important part which is played by phosphoric acid in plant physiology has led the author to determine the proportion of lecithin occurring in certain vegetable organs; the paper forms a summary of the analytical results and the conclusions which they suggest. Seeds which are rich in albumin contain also a greater proportion of lecithin, whilst oily seeds—those, for instance, of *Brassica oleracea*, *Sinapis arvensis*, and *Beta vulgaris*—are poor in lecithin; germination of the last-named is not accompanied by decomposition of lecithin, but in the case of *Pisum sativum* this process involves reduction in the percentage of the substance in question. In the fruit of maize, 74 per cent. of the total quantity of lecithin is found in the embryo and scutellum, only 26 per cent. occurring in the endosperm; from this fact, the author concludes that the lecithin in the scutellum, and especially in the embryo, under the influence of radiant energy, serves to elaborate chlorophyll in the early stages of plant life. Development of the leaf is also associated with the production of lecithin, which increases with the multiplication of chlorophyll granules;

this increase is in some way related to the assimilation of carbonic anhydride, and it appears probable to the author that lecithin arises in the granules themselves as a product of assimilation. Moreover, analyses show that vine leaves, when allowed to grow for 10 days in darkness, contain only one-third as much lecithin as similar, but unprotected, leaves from the same plant collected at the same time of day (4 o'clock).

Chlorolecithin * is an amorphous, greenish-black substance with metallic lustre, which has been isolated from freshly-gathered, unpressed grass leaves; its behaviour towards baryta indicates the presence of choline, glycerylphosphoric acid, and chlorophyllan groups, and, in this respect, it resembles Hoppe-Seyler's chlorophyllan, differing from that substance, however, in the amount of phosphorus present, for whilst chlorophyllan contains only 1·38 per cent., chlorolecithin contains 3·37 per cent.

The author has thus traced an intimate connection between lecithin and chlorophyll, and maintains that, not only does the former substance actually occur in chlorophyll granules, but that phosphorus is a constituent of chlorophyll, and that without this element the elaboration of chlorophyll and the development of chlorophyll granules is impossible.

Examination of apple-blossom has shown that the pedicel is engaged in transmitting lecithin from the leaf to the flower. The petals are richest in lecithin previous to fertilisation, acting as storage vessels, which become rapidly depleted of lecithin when the fruit is formed. The pollen contains 6 per cent. of lecithin, and, Zacharias having shown that nucleïn occurs in this product, it is noteworthy that animal spermatozoa also contain lecithin and nucleïn.

Physiological Observations on Lecithin. T. Hanai. (*Bull. Coll. Agric. Imp. Univ. Tokyo*, 1897, 503-506. From *Journ. Chem. Soc.*) The author's experiments were made with the leaves of *Thea chinensis* and the bark of *Prunus cerasus*. The following (I.) amounts of lecithin, and (II.) of ethereal and alcoholic extract (per cent. in the dry substance) were found at the different dates:—

<i>Thea chinensis</i> (leaves).				<i>Prunus cerasus</i> (bark).		
Old leaf.	Old leaf.	Young leaf.	Young leaf.			
23 Nov., 1895.	26 May, 1896.	1 April, 1896.	26 May, 1896.	23 Oct., 1895.	5 April, 1896.	9 April, 1896.
I. 2·54	0	0·21	1·11	1·88	0·96	0·71
II. 26·18	18·19	9·44	18·67	10·53	10·97	9·52

* This is not a chlorinated derivative of lecithin, as its name would seem to imply.

Whilst the lecithin (and the fat) decreases in old leaves in the spring, there is a gradual increase in the young leaves. The results obtained with bark also show that lecithin is a reserve substance which is consumed in the spring.

The Proteids of the Potato, Pea, and Vetch. T. B. Osborne and G. F. Campbell. (*Journ. Amer. Chem. Soc.*, xviii. 575-609.) The proteids of the potato consist of a globulin, to which the author applies the name *tuberin*, and a small proportion of a proteose. The isolation of these substances and their properties are fully described in the paper.

The proteids of the pea and vetch seem to be identical substances; they are completely soluble in solution of sodium chloride, and consist chiefly of a globulin, the "legumin" of Braconnot, and a second proteid (either an albumin or a globulin), together with a small proportion of a proteose. Legumin is readily precipitable from its salt solutions by dialysis.

Conglutin and Vitellin. T. B. Osborne and G. F. Campbell. (*Journ. Amer. Chem. Soc.*, xviii. 609-623.) The authors report on six different proteids occurring in chemical literature under these two names. The individual substances and their distinguishing properties are fully described in the paper. They comprise "amandin," from almonds and peach kernels; "edestin," from the seeds of hemp, cotton, wheat, rye, barley, maize, and coconut; "corylin," from walnuts and filberts; "excelsin," from Brazil-nuts; "avenalin," from oats; and "conglutin," from lupins.

Compounds from Lichens. O. Hesse. (*Ber. der deutsch. chem. Ges.*, 1897, 357-366.) Compare also *Year-Book of Pharmacy*, 1895, 152 and 153, and 1896, 60. The author supplies some further information respecting usnic acid, atranorin, chrysocetraric acid, rhizocarpic acid, and psoromic acid, the latter of which he finds to be identical with Schunck's parellic acid. Paternò's atranorinic and atraric acids are shown to be nothing but physciol. The author now uses the name *atranorinic acid* for a substance of the formula $C_{18}H_{18}O_9 + H_2O$, which is obtained on heating atranorin (Paternò and Ogliastro's atranoric acid) with dilute acetic acid. Chrysocetraric acid is found to be associated in *Cetraria pinastri* with usnic acid and a new acid, *cetrapic acid*, $C_{17}H_9O_5 \cdot OMe$, melting at $147^\circ C.$, and greatly resembling vulpic acid.

The following are some other acids which the author has obtained from various lichens:—*Divaricatic acid*, $C_{21}H_{23}O \cdot OMe$

(m.p. 129° C.), from *Evernia divaricata*; *ramalic acid*, $C_{16}H_{13}O_6 \cdot OMe$ (m.p. 179° C.), from *Ramalina pollinaria*; *sordidic acid*, $C_9H_{10}O_4 + \frac{1}{2}H_2O$ (m.p. 172° C.), from *Lecanora sordida* var. *rugosa*; *thiophanic acid*, $C_{12}H_6O_{12} + H_2O$ (m.p. 242° C.), and *lecasteric acid*, $C_{10}H_{20}O_4$ (m.p. 116° C.), both from *Lecanora sordida* var. *Swartzii*; *caperatic acid*, $C_{21}H_{35}O_7 \cdot OMe$ (m.p. 132° C.), from *Parmelia caperata*.

Physcion, $C_{16}H_{12}O_5$ (Rochleder and Heldt's chrysophanic acid), has been obtained from *Gasparrisia elegans* (= *Squamaria elegans*), *G. murorum*, and *Candelaria concolor*, in all of which it is the only crystallisable constituent. Neither chrysophanic acid proper (the acid of Chinese rhubarb) nor emodin has yet been found by the author in any lichen.

Vegetable Lipase in *Penicillium Glaucum*. E. Gérard. (*Comptes Rendus*, cxxiv. 370, 371.) The author has observed that the ferments extracted from *Penicillium glaucum* are capable of hydrolysing monobutyrin, causing the liberation of butyric acid. Since this property is not possessed by emulsin, he attributes the hydrolysing action to the presence of Hanriot's *lipase* or an analogous ferment.

Tyrosinase. E. Bourquelot. (*Rep. de Pharm.*, lii. 543.) It is well known that mushrooms and a number of other vegetables contain an oxidising ferment imparting an orange-red colour to guaiacol. The red precipitate thus formed is an oxidation product which itself possesses oxidising properties. This precipitate, when treated with a solution of α -naphthol, soon loses its red colour, while the simultaneous development of a blue colour indicates oxidation of the naphthol.

Tyrosinase can be employed for distinguishing the two naphthols; with α -naphthol it gives a blue, and with β -naphthol a white precipitate. The same ferment produces a green coloration and subsequently a reddish-brown precipitate with creosol.

Tyrosinase also produces distinctive reactions with several medicinal substances. With an aqueous solution of creosote it forms a reddish-brown, with beech-tar a brownish precipitate, and with coal-tar a black coloration without a precipitate.

Morphine is decomposed by this ferment with the formation of a white precipitate, the liquid assuming a yellow colour; this reaction is regarded by the author as a proof of the phenolic character of morphine.

The oxidising action of tyrosinase on phenols and other substances possessing a phenolic function seems also to throw light

on several hitherto unexplained facts. Crouzel's observation, for instance, that guaiacol assumes a reddish colour on the addition of gum arabic indicates the existence of an oxidising ferment in this gum. Apricot-gum shows a similar behaviour.

Laccase and Tyrosinase. G. Bertrand. (*Pharm. Journ.*, from *Comptes Rendus*, cxxiii. 463.) The author has continued his researches on oxidising ferments (see *Year-Book of Pharmacy*, 1896, 63). He finds that laccase and tyrosinase may exist simultaneously in species of *Russula*. Thus, *Russula delica*, after maceration with chloroform water and pressure, yielded a mucilaginous liquid, from which a precipitate was thrown down by alcohol. The filtrate, after concentration by distillation in a vacuum, oxidised hydroquinone and pyrogallol with great energy, but was without action on tyrosin, the action of alcohol and the heat employed having destroyed the tyrosinase present. The precipitate, however, retained the oxidising properties of the primitive juice, and, though after purification and solution in water it did not affect hydroquinone or pyrogallol, it caused rapid oxidation of tyrosin. It seems possible, therefore, to extract from certain fungi a liquid very rich in laccase but without action on tyrosin, and, on the other hand, to obtain from the same plants a solution practically free from the ferment, but manifesting the effects of tyrosinase.

A Soluble Oxidising Ferment in Wine. P. Cazeneuve. (*Comptes Rendus*, cxxiv. 406-408.) The author finds that the so-called "breaking" of wines, consisting in the rapid oxidation and precipitation of the red colouring matter in some wines on exposure to air, is due to the action of a soluble oxidising ferment (an oxydase), analogous to laccase. This substance, for which the name *œnoxydase* is proposed, can be precipitated from such wines by means of strong alcohol, and may be purified by repeated resolution and re-precipitation. It acts on the wine at all temperatures below 60° C., but is quickly destroyed at 65°, and immediately at temperatures exceeding 70°. Its excessive appearance in the wines of some years is attributed to special conditions of vegetation.

Alcoholic Fermentation without Yeast Cells. E. Buchner. (*Ber. der deutsch. chem. Ges.*, 1897, 117-124 and 1110-1113.) Brewery yeast, when thoroughly disintegrated with quartz-sand and kieselguhr, then moistened with water and subjected to strong pressure, yields a liquid which, even after the most perfect filtration, possesses the power of producing alcoholic fermentation

in solutions of cane-sugar, maltose, glucose and fructose. The precautions observed in these experiments were such that this fermentation could not be attributed to any remnants of living protoplasm; the fermentation, moreover, was not prevented by the addition of chloroform. The power of exciting this fermentation appears to be due to a soluble proteid-like substance, for which the author proposes the name *zymase*.

Influence of Oxygen on Yeast and on Alcoholic Fermentation. R. Rapp. (*Ber. der deutsch. chem. Ges.*, 1896, 1983-1985.) The author refers to a statement made by Chudiakow to the effect that the action of yeast on a solution of sugar is impaired and even completely suspended by passing a current of air through the liquid for some time. His own experiments show that these conclusions are based on misleading observations, and that though oxygen appears to be necessary for the multiplication of yeast cells, its presence or absence has no effect on the actual fermentation. Vigorous agitation of fermenting liquids may, however, suppress the fermentation, a fact which seems to explain Chudiakow's results.

The Proteids of Malt. T. B. Osborne and G. F. Campbell. (*Journ. Amer. Chem. Soc.*, xviii. 542-558.) On the extraction of malt with water, five distinct substances are produced, namely, a globulin, an albumin, and three proteoses. *Bynedestin* (malt globulin) is readily soluble in dilute salt solution, from which it is precipitated on the addition of water. This globulin contains 2 per cent. more carbon and 3 per cent. less nitrogen than edestin.

Leucosin is identical in composition and properties with that found in wheat, rye, and barley; it is intimately associated with diastase, and is partially precipitated from its solutions on saturation with sodium chloride or magnesium sulphate.

A *protoproteose* readily precipitated from its aqueous solution by alcohol, and a *protoproteose* less readily precipitated, were also obtained: the composition of the former is the same as that of leucosin; that of the latter is, however, different. The presence of a deuteroproteose and a heteroproteose was also detected.

Bynin is a proteid soluble in water and in saline solutions; it forms about 1.25 per cent. of the malt.

A *proteid*, insoluble in water, in salt solution, and in alcohol, was also isolated. The composition and properties of this proteid were not determined.

Leucinimide, a Hydrolytic Product of Proteids. C. H. L. Ritthausen. (*Ber. der deutsch. chem. Ges.*, 1896, 2109, 2110.)

Leucinimide, a substance previously described as a decomposition product of proteïds and regarded as having the composition $C_6 H_{11} N O$, is now shown to be identical with the pyridine derivative, $C_5 H_7 N O$, obtained by Cohn in the hydrolysis of albumin with boiling hydrochloric acid.

Decomposition Products of Proteïds. S. G. Hedin. (*Zeitschr. für physiol. Chem.*, xxii. 191-196.) Drechsel has shown that albumins, when heated with hydrochloric or phosphomolybdic acid, yield a mixture of bases. From the latter the author has already isolated arginine, whilst, from the precipitates they yield with silver nitrate, Siegfried has obtained a new base in the form of its hydrochloride, $C_{11} H_{20} N_6 O_6, 2 H Cl$.

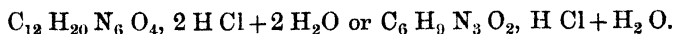
In the present paper the author describes the results of his investigation of this silver precipitate; the latter is decomposed by hydrogen sulphide, and the aqueous solution of the product is mixed with ammoniacal lead acetate, when a small quantity of a compound containing sulphur is precipitated. The filtrate is then freed from lead, and mixed with ammoniacal silver nitrate, the precipitate formed being decomposed by hydrochloric acid, and the filtered solution evaporated nearly to dryness. The *hydrochloride* of the new base separates in beautiful tables of the composition $C_6 H_9 N_3 O_2, H Cl, H_2 O$; it is optically inactive, somewhat readily soluble in water, but insoluble in alcohol and ether; its aqueous solution has an acid reaction.

The free base, $C_6 H_9 N_3 O_2$, crystallises from water in the form of needles or tables. Its aqueous solution has a feeble alkaline reaction, and does not absorb carbonic anhydride; it gives no precipitate with neutral silver nitrate, but on the addition of ammonia a silver compound, $Ag_2 C_6 H_7 N_3 O_2, H_2 O$, is obtained as a voluminous, amorphous precipitate readily soluble in alcohol.

The above base is possibly identical with that of Siegfried, and appears also to be identical with Kossel's histidine, $C_{12} H_{20} N_6 O_4$.

Bases from the Cell-Nucleus. A. C. L. M. L. Kossel. (*Zeitschr. für physiol. Chem.*, xxii. 176-190; *Journ. Chem. Soc.*, September, 1896.) "Protamine" is a substance originally prepared by Miescher from the spermatozoa of the salmon. Piccard attributed to it the formula $C_{16} H_{31} N_9 O_4$. In the present research it was prepared both from salmon and sturgeon sperm. The sulphate from salmon sperm has the formula $C_{16} H_{31} N_9 O_3, H_2 S O_4$. That from sturgeon sperm differs somewhat in its degree of solubility in sodium chloride solution, and by way of distinction the names *salmine* and *sturine* are suggested for these two protamines. By

decomposing sturine with sulphuric acid, a new crystalline base was prepared, which is called *histidine*; its *hydrochloride*, which forms large, colourless, rhombic crystals, has the formula—



Among the other decomposition products arginine was obtained, but little or no amido-acids. The protamines give the biuret, but not Millon's, reaction.

"Thymin," previously prepared from the nuclei of the thymus, is also obtainable as a decomposition product of the nucleic acid of the spermatozoa of the sturgeon.

Nucleic and Thymic Acids. A. C. L. M. L. Kossel and A. Neumann. (*Zeitschr. für physiol. Chem.*, xxii. 74-81.) Nucleic acid is decomposed by hydrolysis into thymic acid, adenine, guanine, and cytosine. The acid isolated from yolk of egg by Altmann is not nucleic acid, as the decomposition products of the latter cannot be obtained from that source.

Thymic acid differs from nucleic acid by its ready solubility in water and dilute mineral acids. The precipitates which it yields with albumin or propeptone are also more soluble in hydrochloric acid than those obtained from nucleic acid. Nucleic acid does not in any way behave as an acid salt of thymic acid.

Compounds of Proteid with Nucleic and Thymic Acids. T. H. Milroy. (*Zeitschr. für physiol. Chem.*, xxii. 307-326.) The nucleins are divided into the true nucleins, which yield alloxuric bases on decomposition, and the para-nucleins, which do not. Nucleic acid and thymic acid are both precipitants of proteid matter, the precipitate consisting of artificial nuclein, in which the acid is very firmly combined. The properties (solubilities, percentage of phosphorus, behaviour towards digestive ferments) of the artificial nucleins prepared from the several proteids (syntonin, albumoses, etc.) by the use of nucleic acid are very similar to those of the true nucleins, whilst those prepared by the use of thymic acid resemble the para-nucleins; this resemblance, however, is not sufficient to establish identity.

Occurrence of a Nucleo-Proteid in Muscle. C. A. Pekelhar-
ing. (*Ber. der deutsch. chem. Ges.*, from *Zeitschr. für physiol. Chem.*, xxii. 244-247.) The author has obtained a nucleo-proteid from the flesh of various animals by extraction with a 0.25 per cent. solution of sodium carbonate and subsequent precipitation with acetic acid. The product causes intravascular coagulation. Its nuclein contains 3.5 per cent. of phosphorus, and yields a

mixture of alloxuric bases in which xanthine and guanine can be readily detected. The phosphorus in the nucleo-proteid amounts to 0.7 per cent.

Proteids of Milk and the Methods for their Separation. A. Schlossmann. (*Ber. der deutsch. chem. Ges.*, from *Zeitschr. für physiol. Chem.*, xxii. 197-226.) The author criticises the methods in use for the separation and estimation of the proteids in milk. As the most trustworthy of these he regards the determination of the total nitrogen and multiplication of its percentage by the requisite factor; but this method is unsuitable for the estimation of the individual proteids. The author confirms the presence in milk of three such bodies, viz., casein, albumin and globulin. The two latter he classes together under the name "water-soluble albumin," and considers that both play an equal part in the nutrition of infants. The importance of the presence of these soluble albumins has already been accentuated by Lehmann; and it is now pointed out that the accurate determination of the ratio of casein to the soluble albumins constitutes the most essential element in any rational system of infant feeding. For this determination the author proposes a new method consisting in the precipitation of the diluted milk at 40° C., with a just sufficient quantity of concentrated solution of potash-alum. The precipitate contains the whole of the casein in combination with alumina, while the soluble albumins are contained in the filtrate and can be precipitated from it by means of tannin. Nitrogen estimations in both precipitates now yield by calculation the proportions of casein and of water-soluble albumin, and the accuracy of the results can be checked by the determination of the total nitrogen in the milk. With regard to the feeding of infants by the bottle, the author again calls attention to the importance of taking into consideration the low percentage of soluble albumin in cows' milk and the injurious effect of sterilization on the digestibility of the already insufficient proportion of an essential constituent.

Changes in Milk. A. Béchamp. (*Bull. Soc. Chim.* [3], xv. 3-5 and 50, 51; *Ber. der deutsch. chem. Ges.*, No. 17.) The author's results lead to the conclusion that the souring of milk is due to acetic and alcoholic fermentation, and that the subsequent coagulation is caused by the precipitation of casein by lactic and acetic acids. Creosote, phenol, ether, chloroform, or corrosive sublimate prevent the development of the microzymes which exist in the fresh milk, and the souring therefore does not take place. Casein does not exist as such in milk, but in the form of alkali-caseinates.

The fat-globules of milk contain, besides butter, an albumin and some microzymes.

Influence of Fat in the Food on Milk. H. Wing. (*Ann. Agrom.*, xxii. 94, 95; *Journ. Chem. Soc.*, May, 1897.) The addition of fat to the fodder of cows increases neither the quantity of milk secreted, nor the amount of fat in the milk.

Rennin and Milk Clotting. A. Edmunds. (*Journ. Physiol.*, 1896, xix. 466-476. From *Journ. Chem. Soc.*) A small quantity of a milk-curdling ferment can be obtained from many tissues besides the stomach, namely, testis, liver, lung, muscle, kidney, spleen, thymus, thyroid, brain, blood, small intestine, ovary.

There is no evidence that casein when reconverted into caseinogen can be re-coagulated by rennin, the apparent re-coagulation described by Peters (*Preisschrift Rostock*, 1894) being probably due to calcium salts present in the rennet extract.

Peptone has a marked retarding effect on coagulation, which may be partly neutralised by calcium chloride.

Casein is soluble in ammonium oxalate solution without being reconverted into "caseinogen."

Grimaux's "colloïde aspartique" has no coagulating effect on milk.

Behaviour of Paracasein with Rennin. O. Hammarsten. (*Zeitschr. für physiol. Chem.*, xxii. 103-126.) The general view that solutions of paracasein (caseinogen) are not coagulated by the enzyme of rennet, while casein solutions are thus coagulated, has recently been called in question by R. Peters. The latter bases his opinion on the observation that a solution of paracasein in lime-water is precipitated by Witte's "essence of rennet." With regard to this observation the author points out that the coagulation referred to was not due to the enzyme, but to the large proportion of sodium chloride present in the rennet preparation as a preserving agent. He has satisfied himself by experiments that this salt is capable of producing this effect under the conditions named. But in its absence, he has never been able to coagulate the calcium compound of paracasein by rennet. Casein, on the other hand, could be readily coagulated by this ferment in the presence of calcium compounds.

Saline Compounds of Casein. F. Röhmnn. (*Berlin. Klin. Wochenschr.*, xxxii. 519-522.) Casein possesses acid properties and is capable of forming neutral and acid compounds with alkalis. The acid sodium salt, which can be precipitated from strong solutions by acetone, appears to be the most useful for dietetic

purposes. The acid calcium salt is precipitable by alcohol and forms a white milk-like emulsion with water. The acid salts may be readily distinguished from the neutral ones by phenolphthaleïn.

With the aid of these salts, the author has obtained mixtures corresponding to cows' and human milk with regard to the caseïn compounds contained therein.

Action of Boiling Hydrochloric Acid on Caseïn. R. Cohn. (*Ber. der deutsch. chem. Ges.*, 1896, 1785-1789.) Caseïn, when boiled during five hours with concentrated hydrochloric acid (sp. gr. = 1.9), yields tyrosine, leucine, carbonic anhydride, ammonia, aspartic acid, glutamic acid, a compound yielding iodoform, an oily acid which is still under investigation, and a pyridine derivative of the formula C_5H_7NO ; the latter is separated from the leucine by means of sulphuric acid. It is sparingly soluble in water, crystallises in long, feathery needles, melts at 296° , and readily sublimes; when quickly heated, it decomposes, acid vapours being evolved; it is not changed by alkalies or acids. No salts could be prepared. When distilled with zinc dust in an atmosphere of hydrogen, pyridine is formed. The yield of crude substance is about 0.6 per cent. of the caseïn employed.

Behaviour of Caseïn towards Pepsin-Hydrochloric Acid. E. Salkowski. (*Pflüger's Archiv*, lxiii. 401-422; *Ber. der deutsch. chem. Ges.*, 1896, 800.) The author has previously shown that in the action of gastric juice on caseïn the greater part of the latter is dissolved in the form of a soluble nucleïn, while only a comparatively small proportion is separated as paranucleïn. His present experiments show that, under favourable conditions, caseïn is wholly soluble in pepsin-hydrochloric acid; the conclusions as to the most favourable conditions are as follows:—Complete solution occurs if the presence of dry, hard lumps of caseïn is excluded; this may be done by making a solution of the caseïn before adding the digestive mixture, which should be present in the proportion of 500 to 1 of caseïn. If the proportion is 250 to 1, about 1 per cent. of the caseïn remains undissolved; the residue increases with smaller proportions. The percentage of hydrochloric acid, which is best, is between 0.054 and 0.216; within these limits, difference in amount of digestion does not occur; above the higher limit, digestion is slightly impeded.

New Method for the Preparation of a very Active Pepsin. C. A. Pekelharing. (*Ber. der deutsch. chem. Ges.*, from *Zeitschr. für physiol. Chem.*, xxii. 233-244.) Artificial gastric juice is precipitated

with basic lead acetate and ammonia, the precipitate is mixed with concentrated solution of oxalic acid, the lead oxalate thus formed removed by filtration, and the filtrate dialysed against water. The flaky precipitate which separates by this dialysis is purified by dissolving it in 0.2 per cent. hydrochloric acid at 37° C. and re-precipitating it by dialysis; it is then collected on a filter and dried in a desiccator. The product is very powerful in its solvent action on coagulated albumin or fibrin, so much so that the author thinks that it may possibly be the really pure pepsin. It is insoluble in water, readily soluble in hydrochloric acid of 0.2 per cent., contains phosphorus, and gives the usual proteid reactions. On rapidly heating the hydrochloric acid solution to about 85° C., it is decomposed, a nucleo-proteid being precipitated together with the phosphorus-containing substance (the latter of which is soluble in alcohol), while an albumose remains in solution. At the same time the liquid loses its power of peptonising albumin. If the pepsin solution be slowly heated to 65° C., this precipitation does not take place, but even then it gradually loses its peptonising power. The nucleo-proteid referred to, when decomposed by acids, yields alloxuric bases.

Alcohol, like heat, destroys the activity of the preparation.

Albumoses. H. Schrötter. (*Monatshefte*, xvii. 199-205.) The products obtained in the treatment of albumoses or their hydrochlorides with acetic anhydride by Henninger's method prove to be simple acetyl derivatives of albumoses, and cannot be regarded as regenerated albumin. True peptones, treated in the same way, yield no such products. The view that peptones are formed by the addition of water to albumin must be abandoned.

Phosphorcarnic Acid, Carnic Acid and Carniferrin. M. A. Siegfried. (*Zeit-schr. für physiol. Chem.*, xxi. 360-379.) This paper gives full details of the researches on these substances, short notices of which have been previously published (see abstracts, *Year-Book of Pharmacy*, 1895, 79 and 178).

Decomposition Products of Carniferrin. P. Balke. (*Ber. der deutsch. chem. Ges.*, 1896, 1004, from *Zeitschr. für physiol. Chem.*, xxii. 248-264) The author confirms Siegfried's observation that carnic acid, obtained in the decomposition of carniferrin, is identical with Kühne's "antipeptone." Both compounds are monobasic acids of the formula $C_{10}H_{15}NO_3O_5$, and agree in their properties and in those of their salts. Carniferrin, obtained from milk, has also been examined by the author. This, on decomposition with barium hydrate, is found to yield a dibasic acid of the

formula $C_{18}H_{28}N_4O_8$, for which the name *orylic acid* is proposed. The decomposition products yielded by this acid, when heated with hydrochloric acid at $130^{\circ}C.$, contain leucine.

Estimation of Phosphorcarnic Acid. M.M. Balke and Ide. (*Zeitschr. für physiol. Chem.*, xxi. 380-386.) The estimation of this acid by precipitation as carniferrin is found to give concordant results if carried out in the following manner:—The diluted meat-extract is heated, to coagulate albumin, and filtered, the phosphates present being then precipitated with calcium chloride and ammonia. The filtrate is neutralised, heated to boiling, and mixed with a 1 per cent. solution of ferric chloride, the latter being carefully delivered from a burette; when a slight excess has been added, the whole is boiled for about two minutes, the addition of ferric chloride being discontinued if the excess be permanent; the liquid is then neutralised with a few drops of ammonia, and finally separated from the precipitate by decantation, the latter process being employed in washing the sediment. The total nitrogen in the dry carniferrin is then estimated and calculated as carnic acid.

Lipase, a New Enzyme in the Blood. M. Hanriot. (*Comptes Rendus*, cxxiii. 753-755, and cxxiv. 235-237.) The author has investigated the nature of the process by which reserve fat passes into the circulation and is utilised by the organism. In searching for a hydrolysing enzyme, he has employed an aqueous emulsion of monobutyrin in preference to the natural fats, on account of the greater facility with which it is capable of undergoing saponification. The amount of saponification taking place with various proportions of butyrin and serum in different times was determined by observing the quantity of a standard solution of sodium carbonate necessary to neutralise the liberated butyric acid. The results are given in a table. The active enzyme, for which the name *lipase* is suggested, is also capable of acting, though much more slowly, on the natural oils and fats. It is very stable, and appears to be as active in the serum after about a week as at the beginning. Its activity increases with the temperature up to about $55^{\circ}C.$, but ceases almost at about 60° , and entirely at 72° .

A New Constituent of Blood. K. Hürthle. (*Chem. Centr.*, 1896, 562.) Fresh blood is found to contain about 0.1 per cent. of a new substance, *hæmosterol*, which appears to be allied to cholesterol, and to have the composition $C_{20}H_{31}(OH)$. It forms needle-shaped, lævorotatory crystals, which melt at $37-42^{\circ}C.$, and are soluble in ether and chloroform and slightly soluble in hot

alcohol. The fused crystals exhibit a blue fluorescence on cooling.

Argon and Nitrogen in the Blood. P. Regnard and T. Schloësing. (*Comptes Rendus*, cxxiv. 302.) The authors have examined the gases obtained from a litre of blood, and found that they contained 0.42 c.c. of argon and 19.98 c.c. of nitrogen. Comparing these proportions with those soluble under ordinary conditions in water and in blood, they arrive at the conclusion that this is not simply a case of dissolution of the gases from the air, they suggest that the membrane separating the blood from the air in the lungs may be the active agent in causing the dissolution of abnormal quantities of the gases.

Non-Occurrence of Argon in the Colouring Matter of Blood. J. Zaleski. (*Ber. der deutsch. chem. Ges.*, 1897, 965-969.) The gas obtained in the combustion of the colouring matter of blood with oxide of copper was completely freed from nitrogen by means of lithium or magnesium, and the residual gas examined spectroscopically. No indication of argon was obtained in any of the experiments.

Oxidation Products of Hæmatoporphyrin and the Composition of Hæmin prepared by different Methods. W. Küster. (*Ber. der deutsch. chem. Ges.*, 1897, 105-110.) Hæmatoporphyrin is formed almost quantitatively by the action of hydrogen bromide dissolved in acetic acid on hæmatin, and is converted by oxidation with chromic acid into the same products as hæmatin, the same two acids, $C_8H_{10}O_5$ and $C_8H_{10}O_6$, being formed.

Hæmin hydrochloride, prepared by the author according to Cloëtta's method, has the formula $C_{32}H_{31}ClN_4FeO_3$ ascribed to it by Nencki, whereas Cloëtta found for it the formula in which the atomic ratio of nitrogen to iron was 3:1. The author ascribes this difference to the action of the concentrated sulphuric acid employed by Cloëtta in its preparation.

Creatinines of Different Origin. M. Toppelius and H. Pommerhne. (*Archiv der Pharm.*, ccxxxiv. 380-397.) Statements having occurred in scientific literature to the effect that creatinines of different origin differ in their properties, the authors have carefully compared pure creatinine from urine, creatinine prepared from the creatine of meat extract, creatinine obtained from urinary creatine, and synthetical creatinine (from creatine prepared synthetically from cyanimide and methylamidoacetic acid). Their results indicate the perfect identity of all the products named.

Changes in Cane-Sugar in the Alimentary Canal. H. Köbner. (*Zeit. Biol.*, xxxiii. 404-407.) The absorption of cane-sugar occurs most rapidly in the stomach and duodenum. No inversion takes place in the stomach, nor in artificial gastric digestion. It begins in the small intestine, but small quantities of unaltered cane-sugar may still be found quite low down the intestine.

Retention of Bromine in the Animal Organism. W. Rosenthal. (*Ber. der deutsch. chem. Ges.*, from *Zeitschr. für physiol. Chem.*, xxii. 227-232.) The author records the interesting observation that during the administration of bromides, minute quantities are retained in the organism and are stored up in various organs. His experiments were conducted on dogs both with potassium bromide and Paal's hydrobromic peptone, which were added to the ordinary food. After death, bromine was detected in the thyroid, liver, spleen, pancreas, kidneys and muscles.

Significance of Chlorides in Anæmia. W. v. Moraczewski. (*Virchow's Archiv*, 1896, 458-480. From *Brit. Med. Journ.*) During anæmia, there is a diminution in the excretion of chlorides in the urine; the excretion increases as the patient gets better. Calcium phosphate behaves like the chlorides. The alkali phosphates and uric acid are increased in amount in the urine in the anæmic periods, this increase lessening with convalescence. An addition of calcium phosphate and sodium chloride to iron salts increases their blood-forming action.

Chemistry of the Thyroid Gland. S. Fränkel. (*Wien. med. Blätter*, 1896, Nos. 13, 14, 15. From *Journ. Chem. Soc.*) The paper gives further particulars regarding the metallic compounds of thyreo-antitoxin (abstract, *Year-Book of Pharmacy*, 1896, 70). A second base was also separated from the proteid-free extract of the gland. The gland contains a considerable quantity of inosite. The conclusion of Drechsel and Kocher, that the organ forms more than one physiologically active substance, is supported.

Nucleohiston. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 159.) This substance is a proteid obtained from the lymph and thymus glands of calves in the form of a white powder, soluble in water, mineral acids and alkalis. It is regarded by Lilienfeld (*Zeitschr. für physiol. Chem.*, xviii. 480) as the active principle of leucocytes. This preparation retards the coagulation of the blood, and possesses antitoxic and bactericidal properties. It contains 3.0-3.1 per cent. of phosphorus.

Occurrence of Nucleohiston in Urine. A. Jolles. (*Ber. der deutsch. chem. Ges.*, 1897, 172-174.) The urine of a patient suffer-

ing from pseudoleucæmia was found to yield a voluminous precipitate with acetic acid, containing about 3 per cent. of phosphorus. No precipitate was formed on saturation with ammonium sulphate. The precipitate referred to was purified by dissolving it in sodium hydrate, and reprecipitating with acetic acid, and was then found to possess all the properties of Lilienfeld's nucleohiston.

The Proteïds of Leucæmic Urine. R. Kolisch and R. Burian. (*Chem. Centr.*, 1896, 972.) The authors direct attention to the occurrence of histon in the urine of patients suffering from leucæmia.

Albumosuria, when present in cases of leucæmia, seems to originate from the decomposition of leucocytes; but it is by no means a constant feature in this disease.

Albumosuria. K. H. Huppert. (*Zeitschr. für physiol. Chem.*, 1897, 500-507.) Some years ago Noël-Paton described a crystalline proteïd obtained from a sample of human urine. Crystallisation occurred spontaneously in the urine on standing, and the proteïd was recrystallised after its separation from the urine by the use of ammonium sulphate. The present article points out that this proteïd, which then was considered to be a globulin, is probably heteroalbumose. The principal ground on which this conclusion is based is the concordance in its ultimate analysis with that of albumoses in other cases of albumosuria, and with that of Kühne's heteroalbumose.

Pyin and Mucin, the Proteïds of Purulent Urine. E. Leidié. (*Journ. de Pharm.* [6], iv. 97-103.) Pyin and mucin are not originally present in pus, but are produced by the action of alkalies. They do not occur in purulent urine while this is fresh and retains its acid reaction; but they make their appearance after ammoniacal fermentation sets in, and the urine then assumes a more or less gelatinous milky appearance. The formation of these two substances takes place simultaneously with the destruction of the leucocytes by the ammonia. Pyin seems to be an alkali-albumin, and the mucin of acid purulent urine a nucleo-albumin, whilst the so-called mucin of the mucus of the bladder is probably a mixture consisting principally of a globulin.

The Yellow Colouring Matter of Urine. A. E. Garrod. (*Journ. Physiol.*, 1897, 190, 191.) A pigment, possessing all the characters of the natural yellow colouring matter of urine, has been obtained by Riva and Chiodera in the oxidation of urobilin with permanganate. The relation of the two substances is now further shown

by the author of this paper, who obtained a pigment of the characters of urobilin by the action of pure aldehyde in neutral alcoholic solution on the yellow colouring constituent of urine. Both colouring matters are supposed to be derived from blood pigment, urobilin being an intermediate, and the yellow pigment a subsequent product of the change.

Reaction of Bilirubin with Iodine. J. L. W. Thudichum. (*Journ. prakt. Chem.* [2], liii. 314-324.) The author's results show that Jolles's statement that bilirubin can be quantitatively oxidised to biliverdin by iodine in alcoholic solution is inadmissible.

A weak solution of bilirubin in chloroform (containing rather less than 0.5 gramme per litre), when treated with an excess of a solution of iodine in absolute alcohol, yielded a deep red liquid which on exposure to light or warming deposited a green substance. The latter, however, was not biliverdin. By shaking the chloroform solution with caustic soda and acidifying the extract, two violet compounds were isolated; the extracted chloroform solution was at first colourless, but speedily became rose-coloured, and then yielded a rose-coloured substance by treatment with caustic soda.

Urobilin. A. E. Garrod and F. G. Hopkins. (*Journ. Physiol.*, xx. 112-143.) Pure urobilin, from whatever source it may be prepared, always possesses the same chemical and optical properties; normal and pathological urines, fæces, and bile all yield the same product. The differences which have been described as existing between the different products are partly due to impurities, and partly to the varying amounts of pure urobilin in the specimens examined. Urobilin is an unstable substance, and is liable to undergo certain modifications; these modified pigments have not the properties of the described pathological urobilins, and are capable of reconversion into the typical form.

The authors call attention to one of the spectroscopic characters of urobilin not hitherto described, viz., a second, narrow absorption band in the neighbourhood of the E line when the pigment is partially precipitated from an aqueous alkaline solution by the addition of an acid.

A good method for extracting pure urobilin from urine consists in saturating the latter with ammonium sulphate after it has been previously freed from urates by saturation with ammonium chloride. The pigment is then dissolved out from the precipitate by water, and reprecipitated with ammonium sulphate, this

process being repeated several times; the final precipitate is dissolved in dilute ammonia, precipitated with a minimal excess of sulphuric acid, washed with saturated solution of ammonium sulphate, and finally freed from this salt by solution and resolution in absolute alcohol. An alternative process, likewise recommended by the authors, consists in the removal of the urates by ammonium chloride, and the acidification with sulphuric acid followed by saturation with ammonium sulphate. The urine thus treated yields its urobilin readily to solvents, of which a mixture of chloroform and ether (1 : 2) is suggested as the most suitable; the ether-chloroform extract is then shaken with water to which a trace of alkali has been added, the pigment passing into solution in the alkaline water. This solution is once more saturated with ammonium sulphate, and the process of extraction with ether-chloroform repeated.

Phenol as a Solvent for Urinary Pigments. W. Kramm. (*Chem. Centr.*, 1896, 713-715.) Liquid phenol is recommended by the author as a very suitable solvent for the extraction of colouring matters from urine. In order to apply it for this purpose, the urine is first saturated with ammonium sulphate and then shaken with about 5 per cent. of phenol, when the latter will take up the pigments. The phenol extract is now mixed with ether and agitated with water; after separation the water contains the urochrome, and therefore appears yellow, while the urobilin is contained in the phenol and ether, which thus assume a reddish tint. Uroerythrin, the pigment imparting a pinkish colour to urate deposits, is not soluble in phenol, and therefore cannot be extracted by it.

Detection of Albumin and Peptones in Urine. A. Jaworowsky (*L'Orosi*, xix. 379. From *Journ. Chem. Soc.*) A reagent composed of ammonium molybdate (1 part) and tartaric acid (4 parts) dissolved in water (40 parts), when added to slightly acid urine, gives a whitish precipitate in presence of albumin or peptones, which, in the former case, is not dissolved by heat, but in the latter dissolves on heating, and separates again on cooling. Most alkaloids are precipitated by this reagent; if these are present, citric acid should be substituted for the tartaric acid used in its preparation, and the urine submitted to a preliminary treatment. This consists in adding excess of sodium carbonate, filtering, evaporating to one third, again filtering, extracting with amylic alcohol, and neutralising with citric acid.

Estimation of Glucose in Urine. B. A. van Ketel. (*Zeitschr. für physiol. Chem.*, xxii. 278-280.) 50 c.c. of the urine are shaken with 4 c.c. of liquid phenol and 10 c.c. of a 10 per cent. solution of lead acetate, then filtered, and the filtrate together with the washings made up to 100 c.c. The sugar is then estimated by the optical method, or after removal of the lead and further dilution, by titration with Fehling's solution.

Estimation of Iron in Blood for Clinical Purposes. A. Jolles. (*Monatshefte*, xvii. 677-696. From *Journ. Chem. Soc.*) The first method described is as follows:—A suitable quantity of blood is evaporated to dryness, the residue strongly ignited, and then dissolved by fusing it with perfectly anhydrous potassium hydrogen sulphate, about 1 gramme of the latter being used for each c.c. of blood originally taken; the operation is best conducted in a platinum crucible, but one of good Berlin porcelain may be used. The contents of the crucible are then rinsed with hot water into a beaker, poured into a flask, treated with dilute sulphuric acid and pure zinc (the amount of iron in which has been previously estimated; about 1 gramme of zinc is used for every 1-2 c.c. of blood taken), boiled until all the zinc has dissolved (the flask being closed with a Bunsen valve), and the amount of iron finally titrated with N/50 or N/100 permanganate. In ten samples of the blood of the same pig, the amount of iron found, per 1,000 grammes of the blood, varied from 0.662 to 0.687; in the blood of eight different pigs, it varied between 0.549 and 0.948.

A second method is to evaporate the strongly ignited residue from 3-5 grammes of the blood several times with strong hydrochloric acid on the water-bath, dissolve the residue in water, and precipitate in the cold with a solution of nitroso- β -naphthol (1-2 grammes of the pure crystallised substance in 100 c.c. of 50 per cent. acetic acid), using about 5 c.c. of the solution per 3 grammes of blood taken. The very bulky precipitate is collected, washed with small quantities of 50 per cent. acetic acid, dried at 100° and finally ignited, the residual ferric oxide being weighed. The whole operation requires about 45 minutes, and the results agree well with those obtained by the first method.

A third colorimetric method is recommended for clinical purposes. It requires two similar Nessler cylinders, graduated up to 15 c.c., and furnished with taps near the bottom; also a ferric solution, for purposes of comparison, made by fusing 0.0358 grammes of pure ferric oxide with 50 grammes of anhydrous potassium hydrogen sulphate, dissolving the product in water and making up to

500 c.c. 0.05 c.c. of blood is measured in a capillary pipette, rinsed out into a crucible, and evaporated to dryness; the residue is strongly ignited and fused with 0.1 gramme of potassium hydrogen sulphate, and the cooled mass is rinsed with hot water into one of the cylinders and diluted to the 10 c.c. mark, whilst in the other cylinder 1 c.c. of the ferric solution is placed, and diluted to 10 c.c. To each cylinder is then added 1 c.c. of dilute hydrochloric acid (1:3), and 4 c.c. of ammonium thiocyanate solution (7.5 grammes per litre), and the liquid is run out from the more deeply-coloured solution until the tint is seen to be the same on looking down through the two solutions. In this way, the amount of iron in the blood can be calculated, the specific gravity of the blood being also determined, if required, by Hammerschlag's method (*Zeitschr. klin. Med.*, xx. 244), which requires only a single drop of blood. The percentage amount varied, in ten adult men, between 0.526 and 0.720; in one anæmic man, it was only 0.441, and in an anæmic woman, 0.433. The results by this method agree well with those obtained by the other two methods, and 10-15 minutes suffice for making the experiment.

The Guaiacum-Test for Active Diastase. B. Pawlewski. (*Ber. der deutsch. chem. Ges.*, 1897, 1313, 1314.) About ten years ago C. J. Lintner described a test for active diastase, consisting in the development of a blue coloration on the addition of the diastase solution to an alcoholic solution of guaiacum resin previously mixed with a few drops of commercial hydrogen peroxide. The author points out that this reaction only affords an indication of active diastase, if the coloration is produced instantaneously, and if no other substances are present giving the same result. In all cases in which the coloration is only developed within a few minutes, the reaction is valueless as a test for diastase, since under these conditions it is shared by a whole series of other substances (peptones, gelatins, albumins, etc.). Even in the absence of any of these substances, the mixture of tincture of guaiacum and hydrogen peroxide alone is apt to assume a blue coloration after several minutes.

Testing of Egg-Albumin. C. Dieterich. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 396, 397.) 1 gramme of the air-dried sample is dissolved in a stoppered litre-flask in 50 c.c. of water, and after complete solution has been effected the unfiltered liquid is mixed with a volume of iodine solution exactly equivalent to 20 c.c. of decinormal solution of sodium hyposulphite. The mixture is allowed to stand for three days, and is then mixed with 500 c.c. of water, and

titrated with decinormal hyposulphite solution with the aid of starch. The quantity of this solution thus required for taking up the excess of iodine should not exceed 11 c.c., which corresponds to an iodine absorption of at least 11.4 to 12 per cent. of iodine. It is absolutely necessary to adhere to the time (three days) of standing before the titration, since the absorption of iodine by albumin proceeds very slowly, and constant results can only be obtained by working under strictly equal conditions of time.

On drying a sample of the albumin to a constant weight at 100° C., the loss should not exceed 15 to 17 per cent.

Reducing Action of Chloroform on Fehling's Solution. C. G. Matthews. (*Journ. Fed. Inst. Brewing*, 1896, 333, 334.) When chloroform is contained in a sugar solution which is to be assayed by means of Fehling's reagent, the chloroform should be previously expelled by boiling, or a correction should be made for the cupric reducing power of this substance. It is found that 1 c.c. of chloroform reduces 1.72 gramme of cupric oxide, or that 1.15 gramme of this oxide is reduced by 1 gramme of chloroform.

Estimation of Glycerine. F. Bordas. (*Comptes Rendus*, 1896, 1071, 1072.) To 5 c.c. of the dilute solution of glycerine, containing not less than 0.1 gramme and not more than 2 grammes per litre, 2 c.c. of sulphuric acid and a just sufficient quantity of potassium bichromate solution (containing 48 grammes per litre) are added, to change the colour of the liquid from bluish-green to yellowish-green. Each c.c. of the chromate solution thus required corresponds to 0.005 gramme of glycerine.

Estimation of Alcohol. H. D. Richmond. (*Journ. Fed. Inst. Brewing*, 1896, 529-535.) Blunt has shown that in the indirect estimation of alcohol by comparing the specific gravity of the liquid under examination with that of the extract obtained after removing the alcohol by distillation and making up the residue to the original volume, the best results are obtained by subtracting the specific gravity of the extract from that of the original liquid +1. The author confirms the accuracy of this statement.

Estimation of Aldehyde in Alcohol. J. Paul. (*Zeitschr. für analyt. Chem.*, xxxv. 647-659.) The process described in this paper is a colorimetric one based on the reaction of aldehyde with a solution of magenta decolorized by sulphurous acid. The reagent is prepared by dissolving the purest "diamond" magenta in a litre of cold water, filtering, mixing a volume containing 0.05 gramme of magenta with an aqueous solution of sulphurous acid,

containing exactly 0.5 gramme of H_2SO_3 , and then making up the mixture accurately to 100 c.c. Full details of the process are described in the paper.

Note on Schiff's Reaction for Aldehydes. G. Urbain. (*Bull. Soc. Chim.* [3], xv. 455, 456.) In the action of aldehydes on Schiff's reagent (magenta solution decolorised by sulphurous acid), coloured condensation products are formed. The reaction is shown to be due to the formation of these products, and not to a mere regeneration of the magenta. These compounds are not decolorised by sulphurous acid.

Tests for the Purity of Chloroform. M. F. Gay. (*Journ. de Pharm. et de Chim.*, 1896, 259.) A piece of filter paper saturated with the chloroform and exposed to the air ought not to remain wet, and should emit none but a pleasant, sweet odour; otherwise amyl alcohol is likely to be present.

6 c.c. of chloroform are shaken with 3 c.c. of water and tested with litmus paper; the latter should not be reddened. A perfectly neutral reaction indicates the absence of hydrochloric, hypochlorous, and chloroxycarbonic acids.

A mixture of equal volumes of chloroform and solution of silver nitrate (1 : 10) should not deposit a white precipitate (absence of hydrochloric acid), and should not turn black upon boiling (absence of aldehyde or acetone).

5 c.c. of chloroform, when warmed with 2 c.c. of a 1 per cent. solution of potassium bichromate in strong sulphuric acid, will indicate the presence of alcohol by the development of a green coloration. A small proportion of alcohol is generally present as a preserving agent, and its quantity may be readily estimated by Yvon's process as follows:—1 c.c. of Mohr's reagent (a solution of 1 part of potassium permanganate and 10 parts of alcoholic potash solution in 25 parts of distilled water) is carefully poured on the surface of 5 c.c. of chloroform contained in a test-tube, and then mixed with it by very gentle agitation, noting the time required from the first agitation to the appearance of a green coloration. If this time amounts to 5 minutes, the chloroform is very pure, while $2\frac{1}{2}$ minutes would indicate about 0.01 per cent., 35 seconds 0.1 per cent., and 5 seconds 0.5 per cent. of alcohol.

10 c.c. of chloroform are well shaken in a small, perfectly dry stoppered bottle with 10 c.c. of pure concentrated sulphuric acid, and the mixture is allowed to stand. With pure chloroform, the mixture remains colourless even after an hour; a brownish coloration, however slight, indicates the presence of chloro-derivatives

of alcohol or that of alcohols of a higher series, especially amyl alcohol.

Detection of Water and Estimation of Alcohol in Chloroform.
A. Béhal and M. François. (*Journ. de Pharm.* [6], v. 417. From *Pharm. Journ.*) The authors find that most of the chloroform of commerce contains water, so that when the liquid is cooled to a low temperature small crystals of ice adhere to the sides of the containing vessel. The presence of water in a sample of chloroform may be easily detected by first freezing the liquid and then, after decanting, applying a few crystals of the double iodide of mercury and ammonium to the spots where the crystals have appeared. In the presence of even a trace of water the yellow crystals assume a bright red tint. Alcohol is determined quantitatively in the following manner:—10 c.c. of chloroform are washed in a separator, first with 4 c.c. of pure sulphuric acid, then with three successive portions of 2 c.c. each, so that in all 10 c.c. of acid are used. This acid solution is then introduced into a small flask, 40 c.c. of water are added, and 20 c.c. slowly distilled over in about twenty minutes. 5 c.c. of this distillate are taken for the determination of the alcohol by the following modification of Nicoloux's method:—This quantity of the distillate is introduced into a test-tube with 2 c.c. of sulphuric acid and placed in a glass water-bath, so filled with boiling water that the level of both the liquid in the test-tube and the water in the bath is the same. The warmed liquid is then titrated with a standard solution of potassium bichromate containing 16.97 grammes of the salt per litre. 2 c.c. of this solution equal 0.01 c.c. of absolute alcohol. This is run in drop by drop until the blue tint at first obtained changes to greenish yellow. One or two drops is sufficient to produce this change when the reaction is complete. The authors have applied this method to the testing of commercial samples, and find that they contain from 12.5 to 3.75 volumes per mille of absolute alcohol.

A Simple Method of Distinguishing Guaiacol and Creosote.
S. Vreven. (*Monit. de la Pharm.*, 1896, 549.) A few drops of the liquid to be tested are mixed in a test-tube with 2 or 3 drops of ether, 1 to 2 drops of hydrochloric acid, and 1 to 2 drops of strong nitric acid. After shaking, the mixture appears reddish-brown, especially the ether layer. On allowing the ethereal solution to evaporate, a formation of needle-shaped crystals will be observed in the case of guaiacol, whereas only oily drops will be left if the substance under examination was creosote.

Recognition and Separation of Different Kinds of Wood-Tar.

E. Hirschsohn. (*Pharm. Zeitschr. für Russl.*, 1897, 14.)

I. Acetic acid of 95 per cent. effects complete solution:—

A. Oil of turpentine dissolves the sample perfectly. Petroleum ether extract of the sample assumes a greenish coloration when shaken with a very dilute solution of copper acetate (1:1000). Chloroform and absolute ether effect complete solutions.—*Pine-tar*.

B. Oil of turpentine has only a slight solvent action. Petroleum ether extract of the sample is not coloured by weak copper acetate solution. Chloroform and absolute ether dissolve imperfectly.—*Beech-tar*.

II. Acetic acid of 95 per cent. does not effect complete solution:—

A. Oil of turpentine dissolves perfectly. (a) Aniline effects complete solution. The filtered aqueous solution of the tar (1:20) produces a red coloration with a very weak solution of ferric chloride (1:1000).—*Juniper-tar*. (b) Aniline dissolves imperfectly. The tar-water assumes a greenish colour with ferric chloride.—*Birch-tar*.

B. Oil of turpentine dissolves imperfectly. Benzol, chloroform, ether, and olive oil also fail to effect complete solution.—*Aspen-tar*.

Estimation of Phenol in Soaps and Disinfectants. H. Fresenius and C. J. S. Makin. (*Zeitschr. analyt. Chem.*, 1896, 325-334.) The authors recommend the following modification of C. Low's process:—The soap is dissolved in water, decomposed by a slight excess of sulphuric acid, and the mixture distilled with the aid of a rapid current of steam. Disinfecting powders are mixed with water and an excess of hydrochloric acid and then distilled. The distillate obtained in either case is mixed in a stoppered flask with an excess of solution of sodium bromide and bromate. It is then treated with hydrochloric acid for about half an hour, afterwards mixed with an excess of potassium iodide, then allowed to stand for twelve hours, and the liberated iodine now titrated as usual. The final calculation is based on the fact that 1 molecule of phenol corresponds to 6 atoms of bromine or to the same number of atoms of iodine.

Tests for Distinguishing Benzol and Benzin. M. Lainer. (*Pharm. Era*, xvii. 329.)

1. The addition of a small crystal of iodine imparts a carmine-red coloration to benzol and a violet one to petroleum benzin.

2. The addition of 3 or 4 drops of a clear, ethereal, 10 per cent. solution of sandarac to 2 c.c. of the sample imparts a permanent turbidity to petroleum benzin; while with benzol the mixture, though turbid at first, soon clears.

3. On shaking the sample with a trace of alcohol, petroleum benzin remains clear, whereas benzol is rendered turbid.

New Methods of Indigo Testing. B. W. Gerland. (*Journ. Soc. Chem. Ind.*, xv. 15-17.) The indigo is converted into the insoluble indigo-monosulphuric acid by means of sulphuric acid (of 1.67 specific gravity) at 100° C., and the product is then treated with concentrated sulphuric acid at 100° C. in order to convert it into the soluble disulpho-acid. Should the solution of the latter be dark coloured, it may be advisable to purify the indigo previous to the estimation by means of hydrochloric acid and hydrogen peroxide.

Another method which is specially recommended for technical purposes consists in the extraction of the indigo with nitrobenzol, and the estimation of the extract.

Detection of Cotton in Woollen Fabrics. (*Annales de Chim. Analyt.*, i. 321. From *Pharm. Journ.*) Five grammes of the shredded material are placed in a large beaker with 200 c.c. of 10 per cent. caustic soda solution, and gradually heated to boiling in about twenty minutes. Wool is entirely dissolved; the solution is filtered off, the residual cotton is washed, dried, and weighed.

Detection and Estimation of Vanillin in Resins and Balsams. K. Dieterich. (*Pharm. Centr.*, xxxvii. 424-427.) The substance is repeatedly extracted with hot dilute hydrochloric acid, the solutions are allowed to cool and then filtered. The filtrate is rendered alkaline, and heated on a steam-bath with hydroxylamine hydrochloride. The vanillinoxime is now repeatedly extracted with ether, and the residue left on evaporating the ethereal solutions dissolved in hot water and allowed to crystallise. At the same time, the vanillin may be detected by means of its colour reaction with pyrogallie acid.

Detection of Acetanilid in some closely related Synthetical Remedies. F. X. Moerk. (*Amer. Pharm. Journ.*, 1896, 389-393.) The author has investigated the behaviour of bromine water towards acetanilid, exalgin, methacetin, phenacetin, phenocoll, lactophenin, and salophen, with the object of ascertaining the value of this reaction, suggested by Hirschsohn as a test for the detection of acetanilid in the other substances named. He finds that this

test fails to indicate 5 per cent. or less of acetanilid in phenacetin, methacetin, phenocoll, and lactophenin.

Better results were obtained with the *iso-nitrile test*, which consists in the formation of phenyl isocyanide or phenyl carbylamine, C_6H_5NC , by heating acetanilid with solution of caustic alkali and a few drops of chloroform or a little chloral hydrate, and the recognition of the product by its peculiar and offensive odour. Except in the case of exalgin, this test may be made more delicate still by removing the disturbing odour due to the other remedies by means of potassium permanganate. The test for an adulteration with acetanilid is performed as follows:—

0.1 gramme of methacetin, phenacetin, lactophenin, salophen, or phenocoll hydrochlorate is boiled with 10 c.c. of water, and the solution quickly cooled and filtered. 2 or 3 c.c. of the filtrate are mixed with an equal volume of 5 per cent. solution of potash or soda, the mixture is boiled and treated with minute fragments of potassium permanganate until the green colour first produced changes to violet or purple after boiling. 2 or 3 drops of a mixture of 10 c.c. of chloroform, 10 c.c. of alcohol, and 0.5 c.c. of ammonia solution are now added, the whole is again boiled, and a little more of the same mixture added to it in case the permanganate has not been completely reduced to brown manganic hydrate. After allowing the chloroform to volatilize, the odour of the mixture is noted, and compared, if doubtful, with the odour yielded by a dilute acetanilid solution treated in the same manner.

In testing exalgin the potassium permanganate is omitted; otherwise the process remains the same.

A Combined Reaction of Quinine and Antipyrine. C. Carrez. (*Journ. de Pharm.* [6], iii. 253–255. From *Journ. Chem. Soc.*) When a mixture of equal parts of antipyrine and quinine is treated with bromine water and then with ammonia, a red coloration is obtained which is given by neither of the alkaloids separately. This red compound, *quinerythropyrine*, is best extracted from its ammoniacal solution by means of chloroform. It is only slightly soluble in pure water, but readily in acidified water. With acids it gives an orange-rose colour, and with alkalis a violet-rose. The reaction can be made use of in testing for quinine or for antipyrine, and is also applicable for urine testing.

Detection and Colorimetric Estimation of Antipyrine. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 866, from *Journ. d. Pharm., Elsass-Lothr.*) The antipyrine is extracted from the solution by shaking with chloroform, and the residue left after the evaporation of the

chloroform solution dissolved in water. On adding to this aqueous solution dilute sulphuric acid and then sodium nitrite, the mixture assumes a blue colour owing to the formation of nitroantipyrine.

For the quantitative estimation 0.02 gramme of antipyrine is dissolved in 25 c.c. of water, and the solution mixed with 1.6 c.c. of 1 per cent. sulphuric acid and 0.8 c.c. of 1 per cent. sodium nitrite solution, and then made up with water to 100 c.c. The solution under examination, similarly treated, is now brought to the same depth of colour by dilution with water, and the proportion of antipyrine is thus deduced from the degree of dilution required.

Tests for Distinguishing the Hydrochlorides of Eucaïne and Cocaine. (*Bull. Gén. de Thérap. Sec. Pharm.*, i. 499. From *Pharm. Journ.*) If to 3.5 c.c. of a solution of eucaïne hydrochloride 3 drops of 5 per cent. chromic acid solution are added, an immediate citron-yellow, distinctly crystalline precipitate is formed. Hydrochloride of cocaine under similar conditions gives no precipitate. The addition of 3 c.c. of 10 per cent. potassium iodide solution to 5 c.c. of a 1 per cent. solution of eucaïne hydrochloride causes a milky appearance, and if left for a time the whole solution becomes converted into a crystalline paste, due to the formation of colourless scales of eucaïne hydroiodide. Solutions of cocaine hydrochlorate are not affected under the same conditions. The solubility of cocaine and eucaïne hydrochlorides are widely different. Of the former 1 part dissolves in 0.75 parts of water at 15° C., while 1 part of the latter requires about 10 parts of water.

A New Reaction of Asparagine. L. Moulin. (*Journ. de Pharm.*, 1896, 543.) Asparagine, when warmed with sulphuric acid and a small quantity of resorcinol, yields a yellowish-green solution which, on the addition of water and neutralization with ammonia or soda, develops a fine green fluorescence. A similar reaction is obtained with "saccharin," and likewise with a crystalline compound obtained by the author from a cold infusion of liquorice by means of dialysis.

Reagent for Cinchona Alkaloids. A. Jaworowsky. (*Chemist and Druggist*, 1897, 676.) The reagent consists of a mixture of equal parts of a 10 per cent. solution of sodium hyposulphite and a 5 per cent. solution of copper sulphate. If this is added drop by drop to the liquid under examination, the presence of quinine, quinidine, cinchonine, or ²cinchonidine will be indicated by the formation of a yellow amorphous precipitate within a minute.

Digitalin-like Reaction of Constituents of Cinchona Bark. A. Beisser. (*Archiv der Pharm.*, 1897, 137-143.) The author finds that cinchotannic acid, when tested with sulphuric acid containing a ferric salt, gives a reaction exactly like that described by Kiliani as characteristic of "*digitalinum verum*." In testing for the latter it is necessary, therefore, to make certain that cinchona bark or its constituents are absent. He also finds that cinchotannic acid is present in very variable quantities in different cinchona extracts, and arrives at the conclusion that this acid not only occurs in different proportions in the various barks, but that it is also present in different states of combination.

The Thalleoquin Test for Quinine. F. S. Hyde. (*Journ. Amer. Chem. Soc.*, xix. 331.) The author shows that the chlorine or bromine water usually employed in this test may be advantageously replaced by a freshly made and filtered solution of calcium hypochlorite. In this case the solution to be tested must, of course, be slightly acidulated before the hypochlorite solution is added.

The Drying of Alkaloids in their Quantitative Estimation. E. H. Farr and R. Wright. (*Pharm. Journ.*, 4th series, iv. 203.) The authors advocate the final drying of alkaloidal residues (obtained in the assay of drugs, etc.) in very flat dishes placed in an air-bath heated to 110-120° C. Complete desiccation is thus greatly facilitated, and in some instances rendered much more certain than by the usual drying process in a water oven at 100° C. The contrast is well shown by the following results obtained in the determination of quinine in a sample of citrate of iron and quinine:—

	Weight at the end of each hour when dried in the hot water oven.						Weight after being heated 1 hour in the hot air bath at 120° C.
	1 hr.	2 hrs.	3 hrs.	4 hrs.	5 hrs.	6 hrs.	
In flat dish . .	·447	·442	·442				·442
In round dish .	·459	·446	·443	·442	·441	·441	·441

A New Reagent for Alkaloids. A. Jaworowsky. (*Amer. Journ. Pharm.*, August, 1896, 452, 453.) Sodium vanadate has been suggested by the author (*Pharm. Zeit. für Russl.*, xxxv. 326) as a reagent for alkaloids in acetic acid solution. The addition of a salt of copper to the reagent increases its delicacy. 0·3

gramme each of sodium vanadate and copper sulphate are dissolved separately in 10 c.c. of water, and, after cooling, the two solutions are mixed. Acetic acid is now added drop by drop until the precipitate of copper vanadate is dissolved; the slightly cloudy solution is filtered, and is then ready for use. It forms precipitates with all the alkaloids.

Alcohol as a Source of Error in the Titration of Alkaloids. C. Caspari. (*Amer. Journ. Pharm.*, September, 1896, 473-481.) The results of a series of experimental observations lead the author to the conclusion that much more accurate determinations of alkaloids and alkaloidal residues can be made in water alone than in mixtures of water and alcohol, and that the error caused by the latter is augmented as the proportion of alcohol is increased. His experiments were conducted with commercial alcohol of good quality, and though this was neutral to litmus, it appeared, in the titrations referred to, to play the part of an acid towards hæmatoxylin, cochineal, Brazil wood, lacmoid and litmus, while it seemed to lend an alkaline reaction to methyl orange or tropæolin O O. He therefore concludes that alcohol should be rigidly excluded in the titration of alkaloids whenever accuracy is desired.

So far as commercial alcohol is concerned, these results are confirmed by L. F. Kebler (*Amer. Journ. Pharm.*, December, 1896, 667-675), who shows, however, that the disturbing effects referred to are chiefly due to impurities in the alcohol, and that perfectly pure alcohol does not vitiate the accuracy of volumetric determinations except in cases in which methyl orange or tropæolin O O is used as indicator.

The Titration of Alkaloids. A. R. L. Dohme and L. F. Kebler. (*Amer. Journ. Pharm.*, September, 1896, 513, 514.) The authors' report is issued on behalf of a Committee appointed to investigate the question of indicators in the titration of alkaloids. The following conclusions were arrived at:—

1. Hæmatoxylin is the indicator, *par excellence*, for titrating alkaloids. Brazil wood and cochineal are also satisfactory, but somewhat less sensitive and not quite as reliable as hæmatoxylin.

2. Pure alkaloidal material can be titrated with satisfactory results, excepting the cinchona alkaloids. Such anomalous results were obtained with the latter, that the authors are inclined to think that the behaviour and nature of these alkaloids is not yet properly understood.

3. Accurate results in the titration of alkaloids can only be

secured by an operator who is in constant touch with the end-reaction tints. But though, in such experienced hands, the titration yields good results, the authors feel convinced that the method has not yet been sufficiently developed to recommend it for general use, and that the average worker will obtain the most concordant results with the gravimetric process.

Estimation of Caffeine in Tea or Coffee. A. Delacour. (*Journ. de Pharm.*, 1896, 490.) Two grammes of the powdered substance are boiled with 80 c.c. of water for about 10 minutes in a 100 c.c. flask. After cooling, the contents of the flask are mixed with 4 c.c. of solution of lead acetate and sufficient water to make up 100 c.c.; the whole is well shaken and then filtered. 50 c.c. of the filtrate are now mixed with 10 to 15 drops of acetic acid, and extracted in a separating funnel with four successive quantities of 20 to 25 c.c. each of chloroform. The united chloroform solutions are now slowly evaporated in a tared flask, and the residue is dried and weighed.

Estimation of Caffeine in Tea. M. Georges. (*Journ. de Pharm.*, 1897, 58.) Five grammes of the finely powdered sample are mixed with fine sand and extracted with a one per cent. solution of sodium salicylate until the percolate comes off free from colour. The resulting liquid is then evaporated to 50 c.c. and exhausted four successive times with chloroform. The united chloroform solutions are evaporated, and the residue dried and weighed. This simple method is stated to yield the caffeine in a pure white condition.

Estimation of Caffeine in Tea. M. L. Q. van Ledden Hulsebosch. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 91.) A mixture of 5 grammes of the powdered sample and 1 gramme of calcium hydrate is heated in an Erlenmeyer flask with 100 c.c. of water for 3 hours. After cooling, sufficient water is added to replace the loss by evaporation. 50 c.c. are then mixed with 0.5 gramme of dry sodium carbonate, the mixture is filtered, then evaporated to about 15 c.c., the residue transferred to a suitable extractor and submitted to the action of ether for 3 hours. On evaporating the united ethereal solutions the alkaloid is obtained in a pure state.

The same process is stated to be applicable to coffee, cocoa, and kola.

Estimation of Theobromine in Cacao. M. Eminger. (*Journ. Soc. Chem. Ind.*, October 31st, 1896.) The author first extracts vegetable fat by digesting 10 grammes of the finely powdered material with 150 parts of petroleum spirit; the residue is then

dried and a weighed portion boiled for about half an hour, or until the formation of cacao-red is completed, with 100 cubic centimetres of dilute sulphuric acid (3-4 per cent.) in a flask fitted with a reflux condenser. The contents of the flask are then turned into a beaker, and, whilst hot, exactly neutralized with the calculated quantity of baryta; the whole is evaporated to dryness with some sand, and the residue extracted in a Soxhlet apparatus with 150 parts of chloroform for 5 hours; the chloroform is then distilled off and the residue dried at 100° C. This residue is then washed with not more than 100 cubic centimetres of carbon tetrachloride, which dissolves the fat and caffeine; the theobromine, being quite insoluble in carbon tetrachloride at 18° C., is collected on a filter, dissolved in boiling water, the solution filtered and evaporated and the residue weighed. By this method the theobromine in different kinds of cacao was found to vary from 1.05 to 2.34 per cent., and the caffeine from 0.05 to 0.36 per cent.

Behaviour of Narcotine and Papaverine in Stas-Otto's Method for the Detection of Alkaloids. R. Otto. (*Archiv der Pharm.*, ccxxxiv. 317-320) Narcotine is but partially and slowly extracted by ether from tartaric acid solutions, but readily from alkaline solutions. Of papaverine only about 4 per cent. pass into the ether from solutions in aqueous tartaric acid; and even from alkaline solutions the extraction of this alkaloid by ether is slow and imperfect.

Identification of Morphine in Toxicological Cases. J. B. Nagelvoort. (*Amer. Journ. Pharm.*, July, 1896, 374-379.) The author's results confirm the observation of Kobert and others that morphine, present in decomposing organic matters, is not easily destroyed by the putrefaction of the latter. Even after putrefaction has proceeded for a period of 50 days, morphine can still be isolated and readily identified. His results also corroborate Tamba's statement that ptomaines have no disturbing effect on the most characteristic reactions of morphine.

The Detection of Strychnine in Corpses. E. Spaeth. (*Chem. Centr.*, 1896, 625.) The author confirms the observation that in cases of poisoning by strychnine this alkaloid can be detected in the corpse even six months after burial.

Further Contribution to Forensic Chemistry. G. Dragendorff. (*Archiv der Pharm.*, ccxxxiv. 55-87.) This report deals with the detection of the following substances:—Pyrodin, malakin, lactophenin, gallanol, analgene, thermodin, neurodin, and symphorols.

Of glucosides and similar active principles the following have been more closely investigated:—Strophanthin, adonidin, helleborein, convallamarin, digitonin and digitalin, saponin, sapotoxin, quillaic acid, phloridzin, amygdalin, hesperidin, ononin, condurangin, podophyllin, podophyllotoxin and pikropodophyllin, cotoin, paracotoin and leucotin, peucedanin and ostruthin. The report concludes with notes on the detection of the following alkaloids:—Quebrachine, aspidospermine and quebrachamine, erythrophleine, ditaine and ditamine, hydroquinine, cupreine, quinamine, cinchonamine, hydrocinchonine, cinchotenine, eserine, eseridine, cytisine and arecoline.

Detection of Hydrocyanic Acid in Forensic Analyses. F. Filsinger. (*Chem. Zeitung*, xx. 305.) Special attention is called by the author to the great delicacy of the guaiacum copper reaction, and its superiority over the Prussian blue and sulphocyanide tests.

Detection of Hydrochloric Acid in Poisoning Cases. A. Gautier. (*Annales de Chim. Analyt.*, i. 413.) The material under examination is largely diluted with water, and gently heated with a sufficient quantity of lithium carbonate, the filtered solution evaporated to dryness, the residue treated with a mixture of 3 parts of anhydrous ether and 1 part of absolute alcohol. The filtered ethereal solution is evaporated, the residue dissolved in a small quantity of water, and this solution tested for lithia, the detection of which proves the presence of free hydrochloric acid in the original substance. In the examination of the contents of a stomach of this method, full allowance must of course be made for the hydrochloric acid normally occurring in gastric juice.

Detection of Mercury in Forensic Analyses. D. Vitali. (*Chem. Zeitung*, xx. 517, 518.) After the destruction of organic matter by the method of Fresenius and Babo, the mercury is precipitated from the filtered and somewhat concentrated liquid by means of sulphuretted hydrogen. The washed and dried precipitate is converted into chloride, and the solution of the latter treated with a piece of gold foil and some small iron nails. The mercury is thus precipitated on the two metals, which are washed, dried, and then heated to dull redness in a test-tube. The ring of sublimed mercury is now rendered visible by removing the gold and iron from the tube, replacing them by a small particle of iodine and applying moderate heat, when the sublimate may be readily recognised by the colour of the mercuric iodide thus produced.

A Delicate Method of Applying the Iodine Test for Mercury. P. Jannasch. (*Zeitschr. anorg. Chem.*, xii. 143-145.) The strip of copper foil on which the mercury has been deposited in the usual manner is carefully washed and dried between filtering paper; it is then placed on a watch-glass close to, but not touching, a small particle of iodine, and covered with another watch-glass for some time. A coating of mercuric iodide will thus be formed along the edges of the copper, and can be distinctly seen under the microscope to consist of dark red plates or octahedra.

Volumetric Estimation of Arsenic. E. Szarvasy. (*Ber. der deutsch. chem. Ges.*, xxix. 2900-2902.) The method recommended by the author consists in the precipitation of the arsenic by means of sulphuretted hydrogen, the subsequent combustion of the sulphide in a current of oxygen, and the determination of the resulting trioxide by iodometric titration. For details, reference should be made to the original paper.

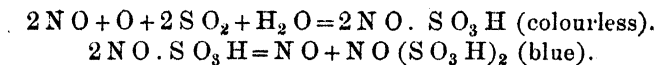
Estimation of Zinc in Organic Salts. G. v. Ritter. (*Zeitschr. für analyt. Chem.*, xxxv. 311-314.) The substance under examination is moistened with strong nitric acid in a porcelain crucible, the excess of acid evaporated at a low temperature, and the heat gradually raised until complete incineration has been effected.

Volumetric Estimation of Zinc by means of Potassium Ferrocyanide. L. L. de Koninck and E. Prost. (*Zeitschr. für angew. Chem.*, 1896, 460-468 and 564-572.) The direct titration of zinc by means of potassium ferrocyanide is unsatisfactory owing to the variable composition of the precipitate formed. Trustworthy results, however, may be obtained by the following process:—10 grammes of pure zinc are dissolved in hydrochloric acid, the solution is nearly neutralised with soda, and made up to 1 litre. The potassium ferrocyanide solution is made by dissolving 27 grammes of the salt in a litre of water; it is standardized by mixing 20 c.c. of the zinc solution with 50 c.c. of a 20 per cent. solution of ammonium chloride, 2 drops of a 10 per cent. solution of sodium sulphite, 10 c.c. of dilute hydrochloric acid (sp. gr., 1.075), and finally 40 c.c. of the ferrocyanide solution. After allowing the mixtures to stand for at least 10 minutes, the excess of the reagent is estimated by titrating with the zinc solution until the uranium reaction is no longer obtained. The relation between the zinc and the ferrocyanide solution is thus accurately determined.

A Delicate Test for Copper. A. Jaworowsky. (*L'Orosi*, xix. 195, 196. From *Journ. Chem. Soc.*) 5 c.c. of the liquid under examination are mixed with 1 or 2 drops of phenol and an excess of ammonia, and the mixture is well shaken and then allowed to stand; in the presence of traces of copper, the mixture becomes turbid and assumes a blue colour, the intensity of which increases in the course of an hour. On shaking with ether, the liquid clears but retains its colour, the precipitate collecting in the zone of contact between the two strata.

A New Reaction of Cuprous Compounds and its Application as a Test for Nitrous Acid. P. Sabatier. (*Comptes Rendus*, cxxii. 1417-1419, 1479-1482, and 1537-1539.) When a small quantity of cuprous oxide is added to concentrated sulphuric acid containing nitrous acid, the oxide dissolves and the liquid assumes a deep violet-purple colour. The same reaction is brought about by finely divided metallic copper obtained by reduction with hydrogen, and also by cuprous salts, but not by cupric compounds. The coloration disappears spontaneously after some time, and is immediately destroyed by the application of heat or the addition of water. The reaction may serve as a delicate test for nitrites.

Further investigation has shown that the foregoing reaction is due to the formation of a blue-coloured acid of the formula $\text{NO}(\text{SO}_3\text{H})_2$, the colour of which is intensified by the formation of its copper salt. The same acid forms a red compound with iron, to which the author attributes the well-known reaction commonly employed for the detection of nitric or nitrous acid. The blue acid just referred to can be prepared by saturating concentrated sulphuric acid with sulphurous acid, cooling to 0°C ., and passing a mixture of equal volumes of nitric oxide and air through the liquid. The resulting solution is colourless, but on the addition of a very small quantity of water it assumes an intense blue colour which disappears when more water is added. Instead of adding water at the end of the process, it is better to employ at once sulphuric acid having the composition $\text{H}_2\text{SO}_4 + \text{H}_2\text{O}$. The formation of this blue acid is represented by the following equations:—



Detection of Ferric Chloride in the Presence of other Iron Salts. P. Apéry. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 767.) A

very weak solution of ferric chloride (1:1100-4000), though at first colourless or almost colourless, assumes a reddish-brown colour on heating to the boiling point and then allowing to cool. This coloration, which is attributed by Bronardel to the formation of colloidal ferric hydrate, is not produced with sulphate, nitrate, lactate, and other iron salts. If, therefore, the presence of iron in a solution has once been recognised by the ordinary means, this simple reaction will readily decide whether or not any of this iron exists in the solution as ferric chloride.

Estimation of Potassium as Platinochloride. E. Bauer. (*Chem. Zeitung*, xx. 270.) The author suggests that the precipitated platinochloride, instead of being collected on a filter and weighed, should be dissolved in hot water (after being washed with 96 per cent. alcohol). The solution should then be evaporated in a platinum dish and the residue dried at 120° C. The advantages of this modification are stated to consist in this, that the double weighing of the filter is avoided as well as any contamination of the precipitate with insoluble impurities or reduction products.

Estimation of Potassium as Platinochloride. C. Fabre. (*Comptes Rendus*, cxxii. 1331-1333.) The usual method of estimating potassium by means of platinum perchloride may be accelerated by dissolving the filtered double salt in hot water, then reducing it by means of magnesium powder, and subsequently titrating the chlorine in the solution with silver nitrate. Details of the process and of the precautions to be observed may be found in the original paper.

Estimation of Potassium as Platinochloride. F. T. B. Dupré. (*Chem. Zeitung*, xx. 305.) In reply to Ruer, the author states that the factor 0.3056, given by Fresenius for calculating the amount of potassium chloride from the platinochloride, is absolutely correct if Fresenius's instructions are followed in every detail. If there be any deviation from the process described, the factor will vary with the degree of purity of the platinochloride resulting from the deviations or modifications adopted.

Critical Studies on the Volumetric Estimation of Alkaline Carbonates and of Mixtures of Alkaline Hydrates and Carbonates. Behaviour of Phenolphthalein and Methyl-Orange as Indicators. F. W. Küster. (*Zeitschr. für anorg. Chem.*, xiii. 127-150.) The author finds that of the various methods which have been proposed for the titration of solutions containing both alkaline hydrates and carbonates, none can be depended upon for perfectly accurate results except A. Winkler's modification of the barium

chloride process (direct titration of the solution containing the precipitate in suspension, with phenolphthalein as indicator). This gives trustworthy results with regard to the proportion of alkaline hydrate present. The total alkali can be readily titrated in the presence of methyl-orange. The same process may be applied, with the requisite alterations, in the titration of bicarbonates. The statement that methyl-orange is not affected by carbonic anhydride is erroneous. It is therefore necessary in the titration of alkalies containing alkaline hydrates to proceed up to a definite normal coloration of the methyl-orange, which should be compared with an aqueous solution, saturated with carbonic anhydride, of the same quantity of the indicator. In opposition to all former statements to the contrary, the author asserts that phenolphthalein is coloured by dilute solutions of alkaline carbonates. The coloration is diminished by the presence of sodium salts of strong acids, and also by carbonic anhydride; but large quantities of the latter are required for its complete disappearance. Hence this indicator cannot be relied on for accurate results in the ordinary titration of alkalies containing alkaline carbonates. The author also deals with the bearing of the theories of modern physical chemistry on these titrations and on analytical operations in general. The paper is full of interesting details, for which the original should be consulted.

Approximate Assay of Cream of Tartar. F. Dietze. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 326.) 2 grammes of the sample are mixed and boiled with 15 c.c. of normal alkali and 20 c.c. of water, and the excess of alkali is then titrated with normal acid in the presence of phenolphthalein. 4.37 to 4.4 c.c. of normal acid should thus be required, showing that 10.6 to 10.63 of normal alkali have been used up in neutralising the sample. The amount of deviation from these numbers quickly gives an indication of the extent of impurity in the sample.

Assay of Commercial Cream of Tartar. A. H. Allen. (*Pharm. Journ.*, 4th series, iii. 4 and 116.) The author recommends the following mode of assay:—

1. Dissolve 1.881 grammes of the moisture-free sample in hot water and titrate with decinormal caustic alkali and phenolphthalein. In the absence of acid potassium sulphate, each c.c. of alkali required represents 1 per cent. of acid potassium tartrate in the sample.

2. Ignite 1.881 grammes of the moisture-free sample at a dull red heat for ten minutes, without attempting to burn off all the

carbon. Boil the product with water, filter, and wash the insoluble carbonaceous residue.

(a) Titrate the filtrate with decinormal hydrochloric acid and methyl-orange. In a pure sample the measure of acid required will be exactly equal to that of the alkali consumed in process 1. The presence of calcium tartrate in the sample does not affect the results. Each c.c. of deficiency of acid represents 0.36 per cent. of calcium sulphate, or 0.72 per cent. of acid potassium sulphate. Any excess of acid required points to the presence of neutral potassium tartrate, each c.c. of difference representing 0.60 per cent. of that salt. If the titrated liquid be treated with barium chloride, the weight of the precipitate of barium sulphate will give the means of directly determining the proportion of calcium or potassium sulphate.

(b) Ignite the carbonaceous residue, dissolve in 20 c.c. of decinormal acid, filter, if necessary, from any insoluble residue of sand, barium sulphate, etc., wash, and titrate the filtrate with decinormal alkali and methyl-orange. The measure required represents the calcium of the sample. Each c.c. corresponds to 0.50 per cent. of calcium tartrate, or 0.36 per cent. of calcium sulphate (anhydrous).

In important cases it is preferable to operate on 3.762 grammes of cream of tartar instead of half that quantity suggested in the above process.

Assay of Sodium Nitrate. A. Pagnoul. (*Ann. Agron.*, xxii. 541-543.) The indirect method of assay, in which the chloride, sulphate, moisture and insoluble matter are estimated and the nitrate determined by difference, is found to give more accurate results than Schloesing's direct process, over which it has also the advantage of showing the exact nature of the impurity present.

Separation of Calcium from Barium and Strontium. S. G. Rawson. (*Journ. Soc. Chem. Ind.*, 1897, 113-115.) The author's method is based on the solubility of calcium nitrate and the insolubility of the nitrates of barium and strontium in strong nitric acid. Full details will be found in the original paper.

Effect of an Excess of Reagent in the Precipitation of Barium Sulphate. C. W. Foulk. (*Journ. Amer. Chem. Soc.*, xviii. 793-807.) When a barium salt is precipitated by sulphuric acid in the presence of hydrochloric acid, a large excess of the reagent is required, especially if the quantity of hydrochloric acid is very large. If the precipitate has to be collected at once, a very large excess of sulphuric acid should be added, as otherwise it

would be necessary to leave the mixture for some time, stirring at intervals. Barium sulphate obtained by the use of excess of sulphuric acid in the presence of hydrochloric acid is coarse and crystalline; that obtained by adding excess of barium chloride is finely divided and liable to run through the filter. The precipitation is not complete unless an excess of the reagent is added, particularly so if there is much hydrochloric acid present. The precipitate always contains occluded barium chloride which no amount of washing can remove; it may, however, be extracted from the precipitate after ignition by repeated treatment with boiling water and re-ignition.

Estimation of Magnesium as Pyrophosphate. H. Neubauer. (*Zeitschr. für angew. Chem.*, 1896, 435-440.) Owing to a want of constancy in the composition of magnesium ammonium phosphate, certain precautions are necessary to ensure correct results whenever the quantity of magnesium to be determined is at all considerable. The sodium phosphate should be added at once, in large excess, to the ammoniacal magnesia solution; it is even preferable to add it to the acid solution, and then to add the ammonia. Excess of ammonium chloride is not hurtful, but in the presence of much ammonium oxalate the precipitate must, after slight washing, be redissolved in hydrochloric acid, and reprecipitated with ammonia and some more sodium phosphate. The precipitate should be ignited over the blowpipe, or a powerful bunsen burner, for at least half an hour, and, after weighing, it should again be heated, to see if there is any further diminution in weight.

Estimation of Pyrophosphoric Acid. M. P. E. Berthelot and G. André. (*Comptes Rendus*, cxiii. 773-776, and cxiv. 261-265.) The solution is precipitated with a mixture of magnesium chloride and ammonium chloride and acetate in presence of a considerable excess of acetic acid. Complete precipitation is ensured by heating the mixture on a water-bath for three or four hours; the precipitate is then washed, dissolved in dilute nitric acid, boiled for about an hour, and the resulting orthophosphate precipitated in the usual manner. The presence of a large proportion of ammonium salts in the liquid in which the precipitate is formed is essential, as otherwise the precipitation is less complete.

The foregoing method is available in the presence of orthophosphoric acid, but it is not generally applicable in the presence of metaphosphoric acid on account of the readiness with which metaphosphates are converted into pyrophosphates. In the presence

of orthophosphoric acid, the filtrate from the precipitated pyrophosphate is concentrated and mixed with ammonia, which precipitates the phosphoric acid in the usual form.

Estimation of Phosphoric Acid by Molybdate. C. Meineke. (*Chem. Zeitung*, xx. 108.) The author shows that the precipitation of phosphoric acid by molybdate solution is not influenced by the presence of an excess of ammonium chloride. The yellow precipitate, after ignition, contains 3.944 per cent. of phosphoric anhydride.

A New Method of Converting Sulphates into Chlorides. P. Jannasch. (*Zeitschr. anorg. Chem.*, xii. 223, 224.) The sulphates are fused with five times their weight of boric anhydride in a platinum crucible, and heated for half an hour, or until the sulphuric acid is completely expelled. The fused mass is then heated with hydrochloric acid and methyl alcohol to eliminate the boric anhydride.

Detection of Nitrates by means of Brucine. P. Pichard. (*Comptes Rendus*, 1896, 590-592.) When a particle of brucine is added to a solution of a nitrite acidified with hydrochloric acid, a vermilion red coloration is produced within five minutes, which subsequently changes to a pale yellow. A nitrate under the same conditions gives no coloration. The delicacy of this test is reduced by the presence of sulphurous acid or sulphites, but not to the same extent as that of the ordinary reactions used for the detection and estimation of nitrites. In such cases, therefore, the brucine test is considered as preferable.

Rapid Estimation of Carbonic Anhydride in the Air. M. Henriet. (*Comptes Rendus*, cxxiii. 125-127.) The author's method is based on the observation that the red coloration produced in a solution of potassium carbonate by a trace of phenolphthalein, disappears on the addition of dilute sulphuric acid exactly at the point at which one half of the original monocarbonate is converted into bicarbonate and the rest into sulphate. The process is practically identical with the one described by F. Kratschmer and E. Wiener (see *Year-Book of Pharmacy*, 1895, 95), and no further details need therefore be given in this place.

A Colour Reaction of Gallic Acid and Tannin. E. Harnack. (*Archiv der Pharm.*, ccxxxiv. 537-542.) The red colour of the precipitate, obtained on adding a few drops of lead acetate solution to a solution of tannin or gallic acid previously rendered

alkaline with potash, was first observed by Buchner (*Liebig's Annalen*, 1845, 357), and ascribed by him to the formation of tannoxylic acid, the composition of which was found by Gerhardt to be $C_7H_6O_6$. The author calls attention to this almost forgotten reaction, and states that the colouring matter thus formed has not been obtained pure, owing to its great tendency to undergo decomposition with evolution of carbon dioxide and formation of a brown substance. He regards it as probably either a quinone or gallic acid or the corresponding quinhydrone.

New Colour Reactions of Tartaric, Citric and Malic Acids. E. Pinerna. (*Annales de Chim. Analyt.*, ii. 66.) When 0.05 gramme of the organic acid is gently warmed in a porcelain dish with 10–15 drops of a reagent consisting of a solution of 0.1 gramme of β -naphthol in 5 c.c. of strong sulphuric acid, the following changes will be observed. Tartaric acid produces a blue coloration, which, during the gradual action of heat, changes to green. If to the cooled mixture 15 to 20 times its volume of water are added, the green coloration passes to a reddish-yellow. With citric acid an intense blue coloration is produced, which does not change to green on the further application of heat. The mixture becomes colourless or only slightly yellow on the addition of 15 to 20 times its volume of water. The presence of even a small proportion of tartaric acid in the citric acid develops the green colour referred to on heating before the addition of water. Malic acid produces a greenish-yellow colour, rapidly passing to yellow, which, on addition to water, changes to orange.

A New Reaction of Picric Acid. A. Swoboda. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 617, 618.) A cold aqueous solution of picric acid, when mixed with a cold solution of methylene-blue, causes the formation of a violet flocculent precipitate, which dissolves in chloroform, ether, or hot water with a blue or greenish colour respectively. On evaporating the blue chloroform solution in a porcelain dish, a violet residue is left.

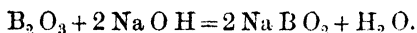
This reaction may also be reversely employed for the detection of methylene-blue by means of picric acid.

Behaviour of Opianic Acid with Reagents for Aldehydes. R. Wegscheider. (*Monatshefte*, xvii. 111–120.) With a solution of magenta decolorised with sulphurous acid, opianic acid produces little or no coloration. With diazobenzeneparasulphonic acid, potash solution and 4 per cent. sodium amalgam, it produces a deep violet-red coloration.

On treating opianic acid with pyruvic acid and β -naphthylamine, Liebermann's β -naphthylamide of opianic acid and Doebner's α -methyl- β -naphthocinchoninic acid are formed. The former of these fuses at 207–207.5°, the latter at 290° C.

On reduction with zinc dust and acetic acid, opianic acid yields opianoximic acid anhydride.

Volumetric Estimation of Boric Acid. M. Hönig and G. Spitz. (*Zeitschr. für angew. Chem.*, 1896, 549–552.) The authors titrate free boric acid in the presence of a large excess of glycerine by means of sodium hydrate, using phenolphthalein as indicator. The red coloration is produced as soon as the amount of alkali added corresponds to the equation—



If the boric acid is not present in the free state, it must be liberated by the slow and careful addition of hydrochloric acid until methyl-orange indicates neutrality. With certain modifications described in the paper, this method can also be made available for the determination of boric acid in insoluble borates, glass, enamels, etc.

Volumetric Estimation of Boric Acid in Milk. G. Jörgensen. (*Zeitschr. für angew. Chem.*, 1897, 5–7; *Journ. Chem. Soc.*, 1897 [ii.], 283.) Doubts having been expressed as to the accuracy of his method, the author now publishes further details, and reasserts the exactness of the process. The milk should first be qualitatively tested for boric acid, and if found present its proportion should be estimated as follows:—100 c.c. of the sample are evaporated with a small quantity of sodium carbonate, the residue is charred, and the carbon burned off as far as possible; the ash is digested for some time in dilute sulphuric acid to expel any carbonic anhydride, and the liquid, filtered from any undissolved charcoal and after adding phenolphthalein, is carefully neutralised with soda solution so as to precipitate the phosphates of the alkaline earths. To this liquid, which should not exceed 50 c.c., 20 c.c. of glycerine are added, and then standard soda, checked against boric acid, is run in until the solution becomes pink.

Effect of Boric Acid on the Reaction of Milk. E. H. Farrington. (*Journ. Amer. Chem. Soc.*, xviii. 847.) The author has observed that a solution of boric acid in milk shows about four times as much acidity as an aqueous solution of the same amount of the acid. He considers that milk apparently containing over

3 per cent. of lactic acid without having a distinctly sour taste, may be regarded as containing an admixture of boric acid.

Detection of Formaldehyde in Milk. G. Denigès. (*Journ. de Pharm.* [6], iv. 193-195.) The sample diluted with water is mixed with a few drops of acetic acid and some potassio-mercuric iodide; the mixture is filtered, then treated with about 1 c.c. of Schiff's reagent (magenta just decolorised by sulphurous acid), and, after 10 to 15 minutes, mixed with about 2 c.c. of hydrochloric acid. In the presence of formaldehyde a violet coloration is produced, the depth of which varies with the proportion of the aldehyde contained in the sample.

Estimation of Formaldehyde in Milk. R. Orchard. (*Analyst*, 1897, 4.) In the separation of formaldehyde by distillation and its subsequent estimation by means of potassium permanganate, a serious error may occur whenever the milk is sour and decomposed. In that case, the distillate may contain organic compounds having a reducing action on permanganate and thus impairing the accuracy of the process. It is also pointed out that the separation of formaldehyde from milk is incomplete unless the distillation is continued almost to dryness.

Detection of Formaldehyde. M. Lebbin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 941.) A few c.c. of the liquid under examination are mixed with about 0.05 gramme of resorcin and an equal, or nearly equal, volume of 50 per cent. solution of sodium hydrate, and the mixture is then boiled. In the presence of formaldehyde, the yellow coloration at first produced soon changes to a fine red. A solution containing but one milligramme of formaldehyde per litre still gives a very marked coloration after half a minute's boiling. Even with one-tenth of this proportion (1 : 10,000,000) the reaction is still discernible.

Detection of Formaldehyde as a Preservative in Articles of Diet. O. Hehner. (*Analyst*, xxi. 94-97.) The author finds that the blue coloration produced when milk containing formaldehyde is carefully added to strong sulphuric acid is due to the presence of the casein. In order to detect this preservative in wine or vinegar, a drop of milk is added to the sample, and the mixture is poured carefully upon the surface of strong sulphuric acid contained in a test-tube. In the presence of formaldehyde a blue ring will be produced in the zone of contact between the two liquids.

The delicacy of the sulphuric acid test for the detection of formaldehyde in milk is confirmed by H. D. Richmond and L. K.

Boseley (*ibid.* 92-94), who admit its superiority to their own test with diphenylamine (abstract, *Year-Book of Pharmacy*, 1896, 80).

Examination of Honey. E. Beckmann. (*Zeitschr. für analyt. Chem.*, xxxv. 263-284. From *Journ. Chem. Soc.*) The products of the action of acids on starch are the substances most generally employed in the adulteration of honey. Since in the manufacture of starch syrup the hydrolysis is carried on only to the point where iodine gives a red reaction, erythrodextrin and amylo-dextrin are commonly present, and may be precipitated from the adulterated honey by the addition of methylic alcohol to its concentrated aqueous solution. Both dextrorotatory (flower) and lævorotatory (conifer) honeys are almost entirely soluble in methylic alcohol. Honey containing starch syrup is coloured red to violet by iodine solution, whereas pure honey gives no such colour. If the hydrolysis of the starch has been carried so far that iodine no longer gives any coloration, as in the manufacture of solid starch sugar, no precipitate is produced by methylic alcohol. Such starch sugar, however, still contains dextrinoid substances, which yield barium compounds insoluble in methylic alcohol, whilst the dextrans of natural honey give no precipitate, or, in the most unfavourable case, that of conifer honey, only about 2.5 per cent. For qualitative testing, 5 c.c. of a solution containing 20 grammes of honey in 100 c.c. are shaken in a test-tube with 2 c.c. of a 2 per cent. baryta solution and 17 c.c. of methylic alcohol, a comparative experiment with a pure honey, of about the same dextrin content, being advisable in doubtful cases. For quantitative estimation, the baryta precipitate should be collected on a Gooch filter, washed first with 10 c.c. of methylic alcohol, then with 10 c.c. of ether, and dried at 55-60°. The more rapidly the whole operation is performed the better. The results obtained with specially prepared mixtures of conifer honey with starch syrup and sugar show that the fact of adulteration can in all cases be detected, although they do not suffice for the calculation of its amount. In doubtful cases, a combination of the fermentation process, using a feebly acting yeast (beer yeast, or yeast of the Saatz type), by which the dextrans of natural honey are more completely fermented than those of starch products, may be resorted to.

The addition of molasses to honey is best detected by examining for raffinose with basic lead acetate (1 part of lead acetate, 3 parts of litharge, and 10 parts of water) and methylic alcohol. The honey solution should not be stronger than 25 per cent., and for 5 c.c.

of the solution 2.5 grammes of basic lead acetate and 22.5 c.c. of methylic alcohol are employed. Conifer honey gives 1 per cent., molasses 50-70 per cent., of lead precipitate.

The Chemistry of Honey. O. Künmann and A. Hilger. (*Forsch. Ber.*, July, 1896, 211.) The authors publish the results of an elaborate chemical investigation of honey, dealing chiefly with the presence and detection of dextrin. They show that this substance is not merely an occasional constituent, but that it normally exists in the form of achroo-dextrin in all kinds of honey. For fuller particulars the original paper should be consulted.

The Iodine Number of Beeswax. R. G. Guyer. (*Chemist and Druggist*, 1897, 574.) The average percentage of iodine absorbed by beeswax is stated by Lewkowitsch to be 9.6, and the range of variation as between 8.3 and 11.0. The author finds the limits of variation to be 7.9 and 8.9; average, 8.5. In his opinion pure beeswax will rarely give an iodine value exceeding 9 per cent. If the iodine value ever does exceed that figure, there will be a correspondingly high acid number. Beeswax adulterated with paraffin wax shows a marked diminution in the iodine value, while an admixture of tallow, resin, and other similar substances will increase the iodine number. Japanese wax, a frequent adulteration of beeswax, gives an iodine number of 4; that of carnauba wax is slightly higher.

The foregoing statements refer only to yellow beeswax. In the case of white or bleached wax, the iodine number is of little service as a test, except from a negative standpoint.

The Iodine Number of Cacao Butter. F. Filsinger. (*Zeitschr. für analyt. Chem.*, xxxv. 517-521.) Further experiments on this subject confirm previous observations that the limits of variation are expressed by the numbers 33.4 and 37.5, all the results obtained being between these two limits.

Detection of Added Alkali in Prepared Cocoa. M. Depaire. (*Bull. de la Soc. Roy. de Pharm. de Brux.*, xl. 233. From *Pharm. Journ.*) The author finds that prepared cocoa powders contain from 25 to 39.2 per cent. of fat, and 3.4 to 6.7 per cent. of moisture. The aqueous solution of the ash from 100 grammes of such cocoas requires for saturation from 34 to 92 c.c. of decinormal acid. Thus the ash from a dry cocoa containing 40 per cent. of fat should not use up more than 100 c.c. of decinormal acid for every 100 grammes of cocoa burnt. All alkali in excess of this

figure may be regarded as "added." The figures obtained for the ash from 100 grammes of this cocoa

containing 1 gramme of added carbonate of potassium	=153 c.c.
" 2 grammes,, " " " "	=306 "
" 3 " " " " " "	=459 "
" 1 gramme " " " " sodium	=190 "
" 2 grammes,, " " " "	=380 "
" 3 " " " " " "	=570 "

of decinormal soda. Obviously the calculation for added soda will be influenced by the amount of "butter" present, the constant above given being for a cocoa containing 40 per cent. of that fat.

The Specific Gravity of Butter Fat as a Test of Purity. R. Brullé. (*Bied. Centr.*, 1896, 638. From *Journ. Chem. Soc.*) The failure of specific gravity determinations of butter fat as a means of ascertaining the purity of butter is attributed to the presence of water, colouring matter, etc. The following method is recommended for attaining the fat in a pure state:—The butter (100–500 grammes) is melted, the fat separated as far as possible, violently shaken for some minutes with finely powdered calcium chloride (5–6 per cent.) and powdered animal charcoal (4 per cent.), and filtered. The fat, which is now colourless and quite dry, has a sp. gr. of 0·8655 at 100°, whilst oleomargarin has a sp. gr.=0·8600, and the addition of 10 per cent. of margarin lowers the sp. gr. of butter fat by 0·00055.

Estimation of Sugar in Fruit-Juices, Syrups, Liqueurs, Confectionery and Honey. S. de Raczkowski. (*Monit. Scientif* [4], x. 19–28.) This paper is divided into four parts, the first of which deals with the alteration in the specific rotatory power of cane-sugar, grape-sugar, lævulose and invert sugar; the second with the reducing properties of different sugars, the third with the calculation of the amounts of different sugars in solution from the optical results, while the fourth part deals with the process for the practical examination of saccharine substances in the presence of optically active admixtures. The original paper should be consulted for particulars.

Detection of Artificial Colouring Matters in Fruit-Juices. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 866, 867, from *Pharm. Zeitung.*) The fruit-juice (of raspberries, bilberries, or strawberries) is diluted in a test-tube with twice its volume of water, then mixed with an excess of solution of lead subacetate, and

immediately filtered through a dry filter. Pure fruit-juices thus treated yield a colourless filtrate, whereas in the presence of aniline colours the filtrate is distinctly coloured.

Detection and Estimation of Cane-Sugar in Wine. P. Kulisch. (*Zeitschr. für angew. Chem.*, 1897, 45-47.) The author effects the inversion of the cane-sugar by means of oxalic acid, which he uses in the proportion of 2 grammes to 50 c.c. of the undiluted wine, or of 1 gramme to 50 c.c. of a mixture of equal volumes of wine and water. The inversion is complete after heating on a water-bath for half an hour.

A Source of Error in the Analysis of Sweet Wines. W. Fresenius. (*Zeitschr. für analyt. Chem.*, 1897, 148.) The author has met with a sample of Malaga wine, which, though unquestionably genuine, exhibited a dextrorotatory polarisation of $+1.8^\circ$, and presented all the analytical characteristics of a wine adulterated with starch sugar. On further examination, it yielded an unfermentable dextrorotatory constituent, which reduced more Fehling's solution after inversion than before. This is supposed to owe its origin to the boiling of the must.

Detection of Artificial Colouring Matters in Red Wines. A. Belar. (*Zeitschr. für analyt. Chem.*, xxxv. 322, 323.) Some of the coal-tar colours can be readily detected in red wines by shaking the sample with an equal volume of nitrobenzol, to which they impart a deep coloration while the natural colouring matter of wine is insoluble in this liquid and leaves it uncoloured. Fuchsine colours the nitrobenzol deep red, methylene-blue emerald green, eosin wine-red. Rosaniline, purpurin, and saffranine dissolve in nitrobenzol without change of colour; indigo-carmin is insoluble in this solvent.

Detection of Coal-Tar Colours in White Wines, and their Distinction from Caramel Colours. A. d'Aguiar and W. da Silva. (*Comptes Rendus*, 1897, 408-410.) The authors have experimented with the amyl alcohol method for the detection of coal-tar colours in wines, and arrive at the conclusion that this process is not likely to lead to any confusion between these colours and caramel.

Colorimetric Estimation of Iron in Wines. A. Bornträger. (*Chem. Zeitung*, xx. 398, 399.) 100 c.c. of the wine are evaporated to dryness, the residue is incinerated, the ash dissolved in water and 5 c.c. of hydrochloric acid (of 1.1 sp. gr.), and the solution made up to 100 c.c. The liquid is now mixed with $\frac{1}{10}$ volume of a 10 per cent. solution of potassium sulphocyanide, and the

resulting red coloration compared with that of a mixture of $\frac{1}{10}$ volume of the same sulphocyanide solution and 1 volume of ferric chloride solution containing 0.01 gramme of iron per litre. Should the wine contain less than 0.0005 gramme of iron per litre, the ash from 200, 300, or 500 c.c. of the sample should be dissolved in 5 c.c. of hydrochloric acid and the solution made up to 100 c.c., in which case the result is to be divided by 2, 3, or 5 respectively. The colorimetric comparison is carried out in the usual manner.

Detection of Traces of Lead and Copper in Potable Waters. C. G. Egeling. (*Ned. Tydschr. Pharm.*, 1896, 113-117. From *Journ. Chem. Soc.*) Two hundred and fifty c.c. of the water are acidified with acetic acid, and treated with sulphuretted hydrogen; 0.5 gramme of talc which has previously been boiled with dilute nitric acid is then added, and the mixture well shaken. The talc as it settles carries down with it even the merest traces of lead or copper sulphide which may have been present. The liquid is poured off, the deposit collected on a cotton-wool filter, and treated with a few c.c. of hot nitric acid. The acid is then evaporated to dryness in a small dish, and the residue tested for copper and lead in the usual way.

Estimation of Traces of Lead in Potable Waters. U. Antony and T. Benelli. (*Gazzetta*, vol. 26, i. 218-220, and ii. 194, 195.) In estimating small traces of lead in water, it is found advisable to add a considerable proportion of mercuric chloride to a measured volume of the sample, before treating with excess of sulphuretted hydrogen; after adding ammonium chloride to ensure the deposition of all the mercuric sulphide, the bulk of the liquid is removed by decantation, the sulphide collected on a filter, dried, then strongly heated with access of air, and the residue treated with sulphuric acid and weighed as lead sulphate. As it is possible that the latter may be contaminated with silica, ferric oxide, or alumina, emanating from the water, it is advisable to dissolve the weighed lead sulphate in hot solution of ammonium tartrate, and to deduct the weight of any insoluble residue thus left.

Purification of Water. T. Royle. (*Ber. der deutsch. chem. Ges.*, 1896, 883.) Ten thousand parts of the water are mixed with 8 parts of a 5 per cent. solution of potassium permanganate and 3 parts of a 10 per cent. solution of manganous chloride. If it be desirable also to soften the water, a suitable addition of lime is made besides that of the chemicals named.

Composition of a newly discovered Mineral Spring containing Iodine and Bromine. A. Lipp. (*Ber. der deutsch. chem. Ges.*, 1897, 309-312.) The spring referred to in this paper is situated near the village of Seeg, in the Bavarian Algäu. Its composition is found to be as follows:—

	Grammes per litre.
Sodium iodide . . .	0.01757
Sodium bromide . . .	0.01516
Sodium chloride . . .	2.26777
Magnesium chloride . .	0.10969
Calcium carbonate . . .	0.28660 = 0.46429 bicarbonate
Magnesium carbonate . .	0.03222 = 0.05600 ,,
Sodium carbonate . . .	0.03406 = 0.05398 ,,
Ferrous carbonate . . .	0.00362 = 0.00556 ,,
Silica	0.00650
<hr/>	
Total solids	2.77319
Carbonic anhydride,	
half-combined . . .	0.15849 "
Ditto, free	0.02651 = 13.4 c c.

MATERIA MEDICA AND PHARMACY.

PART II.

MATERIA MEDICA AND PHARMACY.

Alkaloid-Strength of Different Parts of Belladonna. A. Kremel. (*Chemist and Druggist*, 1897, 848.) The author has examined the various parts of belladonna for alkaloid with the following results, calculated on the dry material:—Root, 1·75 per cent. of alkaloid; stems, 0·616; leaves, 0·7; unripe fruits, 0·6 per cent. He further finds that preparations of the drug decrease in alkaloidal value to the extent of about 0·1 per cent. per year. Specimens of the root were also gathered in June and October from the same spot, and examined. The June root yielded 0·88 per cent. of alkaloid, and 26·6 per cent. of solid extract; the October root 0·225 per cent. of alkaloid, and 16·6 per cent. of extract.

Actæa Racemosa (Cimicifuga Racemosa) in Acute Rheumatism. A. Hewelke. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 95.) The author recommends a tincture of this drug (1:5) for the treatment of acute rheumatism. It is given in doses of four drops repeated every two hours.

Gelsemium. L. E. Sayre. (*Amer. Journ. Pharm.*, January, 1897, 8-13.) The author finds that the gelsemium of the market is composed of the rhizome, root and stem in varying proportions, and gives the results of a microscopical examination of sections of the three parts. In the stem are found comparatively large bundles of bast near the wood, just outside the cambium, whereas in the rhizome the bast is arranged near the corky layer, and in an interrupted ring rather than in bundles. In the root the bast is entirely absent, but there are several layers of cork. The following description is suggested for the official rhizome and root:—Rhizome cylindrical, cut or long in sections, mostly 5 to 15 millimetres, and occasionally 3 centimetres thick; externally light yellowish-brown, with purplish-brown longitudinal lines;

tough and woody, fracture splintery; bark thin, with silky bast fibres near the pale-yellowish porous wood, which has fine medullary rays, and a small pith which, under the lens, is seen to be usually divided into four segments. The root is 2 to 10 millimetres thick; externally lighter than the rhizome; fracture brittle; thick bark closely adhering to the light-yellowish wood. Both rhizome and root have an aromatic odour and bitter taste.

A chemical examination of the different parts—stem, rhizome and roots—is in progress.

Gelsemium. L. E. Sayre. (*Amer. Journ. Pharm.*, May, 1897, 234, 235.) This paper furnishes an account of an analysis of the root, rhizome and the stem of this plant, showing the percentages of the constituents in each of the organs named. The results are given in the following table:—

Constituents.	Rhizome.	Root.	Stem.
Moisture	3.2	3.	3.8
Volatile oil	0.5	0.4	Tracc.
Fixed oil	5.6	7.4	3.2
Resins	4.4	2.4	3.8
Gums	0.8	0.7	1.1
Gelsemine (alkaloid)	0.2	0.17	—
Gelsemic acid	0.37	0.3	—
Starch	6.8	7.6	6.3
Ash	2.6	2.2	2.7
Other organic acids	2.7	2.8	1.9
	27.17	26.97	22.8
Inert material, cellulose, etc.	72.83	73.03	77.2
Total	100.	100.	100.

A notable feature in these results is the absence of appreciable quantities of alkaloid and of gelsemic acid in the stem.

Balsamorhiza Terebinthacea, a New Drug. L. E. Sayre. (*Drugg. Circ.*, 1897, 32.) This plant belongs to the *Compositæ*, and grows in Western Idaho and Eastern Oregon on hard, stony ground. The root is stated to be useful in certain cardiac affections, and for curing the tendency to over-indulgence in tobacco.

The root is much twisted, 1–6 inches in length, light-brown to black; the wood-fibres are pale yellow or nearly white. The

pores of the spongy root are filled with a brownish-yellow resinous balsam, which imparts to the root a strong turpentine-like odour, and renders it readily inflammable. The taste of the root is burning and aromatic; its mastication causes irritation of the tongue and throat.

The transverse section exhibits under the microscope a moderately thin bark with a rough and broken epidermis; the outer parenchyma cells are strongly distended and serve for storing the resin. The xylem surrounds a series of larger resin cells, which enclose the medulla.

A chemical analysis, carried out by M. T. Kelly, showed the presence of 9.25 per cent. of moisture, 5.72 per cent. of ash, 0.42 per cent. of volatile oil, 5.28 per cent. of fatty oil, 9.04 per cent. of resin, 0.4 per cent. of organic acids precipitable by lead acetate, 0.25 per cent. of sugar, 1.4 per cent. of gum, and small quantities of dextrin and glucose. No indication of alkalies was obtained.

Active Principles of Sarsaparilla. W. v. Schulz. (*Chem. and Drugg.*, March 20th, 1897, 473, from *Arch. des Pharmakol. Inst. Dorpat.*) The author reports upon three glucosidal principles of the saponin group, viz., parillin (the smilacin of the older observers), smilasaponin, and sarsaponin. Parillin has the formula $C_{26}H_{44}O_{10} + 2\frac{1}{2}H_2O$, crystallises in thin plates or prisms, is almost insoluble in cold water, and easily soluble in strong alcohol; $a_D = -42.33^\circ$, m.p. 177.06° corr. Smilasaponin has the formula $5(C_{20}H_{32}O_{10}) + 12H_2O$, is amorphous, forms a gummy mass with little water, and dissolves to a levorotatory solution; $a_D = -26.25^\circ$. Sarsaponin has the formula $12(C_{22}H_{36}O_{10}) + 24H_2O$, crystallises in thin, long needles, slightly soluble in a little cold water; $a_D = -16.25^\circ$, m.p. 223.45° corr. These three sarsaparilla glucosides are homologous, and give, by warming with concentrated sulphuric acid and a drop of water, Pettenkofer's gallic-acid reaction. They belong to the sapotoxin pharmacological group. The paper gives a full historical, botanical, and pharmagnostic account of sarsaparilla.

Indian Podophyllum. W. R. Dunstan. (*Imp. Institute Journ.*, December, 1896; also *Chemist and Druggist*, December 5th, 1896, 827.) Indian podophyllum is derived from *Podophyllum emodi*, and is found by the author to contain on an average $2\frac{1}{2}$ times as much resin as the American podophyllum from *P. peltatum*. The medicinal action of the Indian resin has been examined by

H. W. G. Mackenzie, who finds that the two resins are identical in their medicinal effects, and that, therefore, there is no reason why the resin obtained from the Indian root should not be substituted for the American resin. A complete account will shortly be published of the chemistry of the two plants, and of the nature of the substance to which podophyllin owes its medicinal activity.

Podophyllum and its Resin. H. J. Lohman. (*Merck's Report*, v. 353.) The author points out that podophyllin is not found in the fresh drug, but develops after drying, and does not reach its maximum until the dried podophyllum rhizome is at least two years old. Galenical preparations of podophyllum should, therefore, be prepared from the properly seasoned drug. The author also alludes to the well-known difference in colour between podophyllin obtained by precipitation with dilute hydrochloric acid and that precipitated with the aid of alum. The latter product he regards as less cathartic, and more liable to cause griping than the resin obtained by the acid process.

Adulterated Hydrastis Rhizome. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 946, from *Apotheker Zeitung*, No. 25.) A few years ago attention was directed in the *Pharm. Weekblad* to an adulteration of the rhizome of *Hydrastis canadensis* with that of *Aristolockia serpentaria*. The same adulteration has again been met with recently in shipments obtained *via* Hamburg. A superficial examination suffices to at once arouse suspicion by the paler appearance of the serpentary roots, and especially by the difference in colour between the surfaces of the fracture of the two drugs.

Spurious Blood Root. E. M. Holmes. (*Pharm. Journ.*, 4th series, iii. 21.) The author gives a description, accompanied by woodcut illustrations, of the rhizomes of *Chamaelirium carolinianum* (*Helonias dioica*) and *Sanguinaria canadensis*, the former having occurred as an admixture in the latter notwithstanding its higher price. He shows that the two drugs may be readily distinguished as follows:—

The rhizome of *S. canadensis* has an annual growth marked by constrictions, giving to it a knotted or moniliform appearance. It is scarred, with the appressed bases of the leaves, which form not very obvious dark lines on the surface about 2 mm. apart. Rootlets are rarely present, and are very slender, blackish, and easily broken off. The transverse surface of the rhizome, when cut, shows either a uniform dark blood-red colour or a whitish starchy

surface with numerous red dots scattered over it. The root bark forms a thin blackish line.

The rhizome of *Chamælririum* is almost identical in size and general appearance, but the transverse marks are much more numerous and form whitish wavy lines only $\frac{1}{2}$ mm. apart, and as seen under a good lens they project at right angles to the rhizome. The external surface of the rhizome is greyish, and the rootlets are evidently those of a monocotyledon, as they are not continuous with the outer surface, each leaving a small hole when broken off, thus giving to the rhizome a perforated appearance, which is, of course, not seen in *Sanguinaria*. The transverse surface is of a dirty white hue and horny texture, and exhibits a well-defined central column occupying about one-third of the diameter, and containing irregularly placed vascular bundles. The outer portion surrounding the central column shows a few scattered holes containing traces of the rootlets, but there are never any red resinous dots present, as in *Sanguinaria*. It is easily detected, therefore, by the greyish surface perforated with small holes, and by the transverse section exhibiting a well-defined central column.

According to T. V. Greene, the rhizome of *Chamælririum carolinianum* contains a bitter principle called "chamælririn," which is stated to act as a cardiac depressant, i.e., exactly opposite to the primary action of *Sanguinaria*. In medicine the rhizome is used as a tonic, diuretic, and anthelmintic.

Aconitum Septentrionale. H. V. Rosendahl. (*Journ. de Pharm.* [6], iv. 262-266.) This plant has yielded the three alkaloids, lapaconitine, septentrionaline, and cynoconitine. *Lapaconitine*, $C_{34}H_{48}N_2O_8$, forms well-developed crystals, probably hexagonal; it melts at 205° , is soluble in 126 parts of alcohol, 330 parts of ether, or 1,472 parts of water; the solutions of the alkaloid and of its salts are dextrogyrate and possess a reddish-violet fluorescence.

Septentrionaline, $C_{31}H_{43}N_2O_9$, is a yellowish powder melting at 128.9° ; it acts as an anæsthetic. Its solutions and those of its salts are dextrogyrate and non-fluorescent; it is readily soluble in alcohol and ether, but only moderately so in water.

Cynoconitine, $C_{36}H_{55}N_2O_{13}$, is an extremely hygroscopic, amorphous alkaloid, and readily decomposes. It is readily soluble in alcohol, moderately in water, and very sparingly in ether. It melts at 137° , and its solutions are dextrorotatory but non-fluorescent. With sulphuric acid, it gives a reddish-brown coloration, and if evaporated just to dryness in the presence of fuming nitric

acid, it yields a residue, which on treatment with alcoholic potash gives a blood-red coloration.

Constituents of Jalap Tubers. M. Hoehnel. (*Archiv der Pharm.*, ccxxiv. 647-685.) Convolvulin, $C_{51}H_{96}O_{27}$, the glucoside obtained from jalap by Mayer's method, after purification by repeated solution in alcohol and precipitation with ether, is a purely white, amorphous substance, insoluble in ether, benzol, and water, only sparingly soluble in chloroform, but readily so in alcohol, glacial acetic acid, and ethyl ether. It melts at $150-155^{\circ}$ and readily reduces ammoniacal silver nitrate, but acts slowly with Fehling's solution unless previously hydrolysed. On hydrolysis with barium hydrate, the glucoside yields, in addition to methyl-ethylacetic acid, *purgic acid*, $C_{25}H_{46}O_{12}$, and "convolvulic acid," $C_{45}H_{80}O_{28}$. The latter, when hydrolysed by superheated steam, yields *d*-glucose and *convolvulinolic acid*, $C_{15}H_{30}O_3$, and this, on oxidation with potassium permanganate or with nitric acid, yields *ipomic acid*, $C_{10}H_{18}O_4$, which is isomeric with sebacic acid.

Cepa Caballo. K. Peinemann. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 645, 646.) The name *Cepa caballo* is used for several distinct drugs. Thus, in Spain, it is applied to *Xanthium strumarium*; in Colombia, to *Xanthium spinosum*; and in Chili, to *Carlina acaulis*, and also to *Acena splendens*, the latter belonging to the *Rosaceæ*.

The *Acena* species are shrubby or herbaceous plants extensively distributed in sub-tropical South America. From there the genus extends along the Andes as far as Mexico, and even up to California. Besides *A. splendens* several other species are used medicinally in Chili, viz., *A. argentea* and *A. pinnatifida*. All the three species enjoy a reputation as diuretics, and *A. argentea* is also employed in the treatment of syphilis.

The specimen of the drug (the produce of *Acena splendens*) examined by the author, was obtained from Valdivia, and found to consist of the root and underground stem, the latter of which branches upwards and is covered on the surface of the soil with the remains of decayed leaves, succeeded higher up by distinctly recognisable pinnate leaves. These have two or three pairs of lateral leaflets and one larger terminal leaflet; the leaflets are broadly lanceolate or lanceolato-ovate, the terminal leaflet about 2 cm. and the lateral leaflets about 1.7 cm. long, slightly serrated on the lower margin and more distinctly so towards the apex. All are thickly covered with hairs and have a very pale (almost whitish) green colour and a silky lustre. The transverse section of

the leaves shows a thick-walled epidermis with distinct cuticula, and a double layer of narrow palisade cells; the primary vein, which towards its lower end shows collenchyma, is very pronounced, and the secondary veins diverge from it in acute angles. The hairs are one-celled and terminate in a fine point.

The root is 3 cm. thick, and irregularly curved and twisted. When examined with a lens, the yellowish brown woody portion appears radially streaked. The bark is 2 mm. thick, and shows on its outer surface longitudinal wrinkles and transverse cracks.

Superficially examined, the drug shows a considerable resemblance to rhatany, though the colour of its exterior is less striking. A closer examination, however, reveals marked differences. The percentage of tannin is also much lower. The root bark of *Cepa caballo*, which is the part richest in tannin, contains 5.6 per cent. of this substance, while the leaves contain 2.85 per cent. In this respect it differs also materially from guayaquil rhatany described by Holmes in 1886.

Palo Panguy. K. Peinemann. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 646, 647.) The drug employed in Chili under the name *Palo Panguy*, also *Raiz Panguy*, *Pangue*, or *Panke*, consists of the sliced root of *Gunnera chilensis*, a plant somewhat resembling *Rheum* in its general appearance. The root is employed technically for tanning and dyeing; but the crushed leaves are used therapeutically in the form of compresses as an external refrigerant in febrile conditions. The decorticated leaf stalks known under the name of *Nalcas* have a pleasant sweet and acid taste, and are eaten in the same way as the petioles of rhubarb in European countries.

Palo Panguy, the drug reported upon by the author, consists of slices or discs of the root, up to 13 cm. in diameter, and up to 3 cm. thick. They are pale brown in colour, and have a more or less curved appearance caused by drying. The surfaces show irregular vascular bundles. The tissue of the discs consist of large-celled parenchyma; the cells contain tannin, calcium oxalate, and starch, the latter in oblong granules, up to .42 mm. long and .28 broad. The smaller granules are round, and all show distinct concentric layers. The tannin in the drug amounts to 9.34 per cent.

Anacyclus Pyrethrum. A. Schneegans. (*Chem. Zeit.*, xx. 846.) The author has obtained pure "pyrethrin" from the root of this plant by dissolving the dry alcoholic extract in absolute alcohol, treating the solution with lead acetate, evaporating the filtrate to the consistence of a syrup, mixing this with lime and

sand, and extracting the dried mixture with petroleum spirit. It crystallises in colourless needles which melt at 46° C., have a hot acrid taste, and are soluble in absolute alcohol, ether, chloroform, benzol, acetone, acetic acid, and carbon bisulphide. When dissolved in strong sulphuric acid it develops a yellow coloration which soon changes to red. The principle is being further investigated.

Constituents of Taraxacum. L. E. Sayre. (*Amer. Journ. Pharm.*, September, 1896, 518.) The author has further studied taraxacin, the bitter principle of dandelion, which he finds to be soluble in cold water, very soluble in hot water, or alcohol, ether, and chloroform. Its aqueous solution is straw-coloured and intensely bitter. All attempts at crystallisation proved unavailing; but the gummy extractive, when allowed to deposit in a thin film on crystallising dishes, showed under the microscope acicular crystals of arborescent and stellate forms. These were proved to be the result of oxidation, and by repeatedly dissolving the gummy, bitter, uncrystallisable substance in hydrogen peroxide, the whole mass was converted into similar crystals, which proved to consist of oxalic acid. The bitter principle reacts with all alkaloidal reagents; it unites with phosphomolybdic acid to form a sparingly soluble compound, and shows some indication of being a glucoside. After treatment with ammonia it is rendered more soluble in water than in chloroform, the reverse of its original condition. Besides this bitter principle, two resins have been separated from taraxacum—one soluble in chloroform and insoluble in alcohol, the other soluble in 80 per cent. alcohol.

Sumbul. J. H. Hahn. (*Amer. Journ. Pharm.*, July, 1896, 395.) The author's chemical examination of the commercial drug shows the presence of 17.25 per cent. of a thick, viscid, yellowish fixed oil, having a disagreeable odour. It was found to be soluble in alcohol, ether, and carbon bisulphide, and was readily saponified by alkalis. On adding a drop of sulphuric acid to 3 or 4 drops of oil, a crimson-brown colour was produced, changing in a short time to a beautiful dark purple, and after 24 hours to brownish black. By mixing the fixed oil with a quantity of petroleum benzin, and pouring the whole upon a filter, crystals were deposited which, after being thoroughly washed with benzin, were re-crystallised from bisulphide of carbon. These crystals have not yet been further investigated.

The drug contained 4 per cent. of moisture and yielded 8 per cent. of a greyish-white ash.

English Sumbul. E. M. Holmes. (*Pharm. Journ.*, 4th series, iv. 347, 348.) The author directs attention to the inferior quality of the sumbul root now met with in commerce as compared with the fragrant root imported twenty-five years ago or more. The former generally consists of smaller and more cylindrical pieces, with only a very faint musky odour. The structure is also much firmer, and the resinous parts are usually blackish and dirty, in strong contrast to the paler non-resinous portions. The upper or root-stock portion, which is marked with rings like the true sumbul, is evidently often branched, which is never seen in the true sumbul, in which the upper portion usually tapers to a rounded fibrous apex. The sumbul of the present day appears, therefore, to be derived from a different plant, which, according to J. E. Aitchinson (*Trans. Linn. Soc.*, ser. ii. 69) may possibly be *Ferula suaveolens*.

The author considers it desirable, therefore, that the true sumbul should be cultivated to meet a trade desideratum, as the use of an inferior root would otherwise probably lead in time to the entire disuse of the drug. The receipt from A. Ferrein, of Moscow, of some young plants of *Ferula fetidissima* and *F. sumbul*, have enabled him to make experiments in this direction. The author's plants are now about six years old and the roots have reached a length of about 6 inches by $3\frac{1}{2}$ inches breadth; they have a strong, persistent, musky odour where injured, exuding an abundance of white milky juice. They are somewhat twisted, and spread almost horizontally below the ground. From the shape he considers it obvious that such a root might furnish two tapering and one cylindrical sections of the thickness of the old-fashioned, but that it could not supply the cylindrical pieces two or three inches long of small diameter occurring in the drug of the present day. The author has no doubt that, if good seed could be obtained, sumbul might without difficulty be cultivated in temperate or mountainous districts in the colonies, or in ordinary gardens or fields in this country. In the latter it would be necessary, however, to protect the ripening fruits from rain to avoid the risk of their getting ruptured, in order to obtain a supply of good seed.

Solanum Carolinense. C. G. Johnson. (*Amer. Journ. Pharm.*, 1897, 76-84); also M. Clayton Thrush, *ibid.*, 84-89. These two papers contain a description, accompanied by wood-cut illustrations, of the root, stem, leaf and fruit of this plant. For particulars the original should be referred to.

Ononis Spinosa. H. Thoms. (*Ber. der deutsch. chem. Ges.*, 1896, 2985-2991.) The roots of *Ononis spinosa* yield the glucoside ononin and a substance to which Hlasiwetz has given the name onocerin. The latter compound has now been investigated by the author, who regards it as a dihydric secondary alcohol of the composition $C_{26}H_{44}O_2$, and suggests for it the new name *onocol*. It is obtained by extracting the roots with 90 per cent. alcohol, evaporating, treating the residue with 60 per cent. alcohol, and crystallising the insoluble portion from absolute alcohol. It appears to be related to cholesterol.

Constituents of the Root of Imperatoria Ostruthium. C. E. Merck. (*Chem. Centr.*, 1896, 561.) Previous investigations have shown this root to contain three principles, viz., pencedanin, oxypencedanin, and ostruthin. In addition to these it is now shown to contain a fourth constituent for which the name *osthin* is proposed. It crystallises from alcohol in yellow needles, which melt at 199-200° C. and are insoluble in water. It forms yellow solutions with sulphuric acid and with alkalis. Its composition is represented by the formula $C_{15}H_{16}O_5$.

The Root of Phytolacca Decandra. G. B. Frankforter and F. Ramaley. (*Amer. Journ. Pharm.*, 1897, 281-290.) The authors give a sketch of previous investigations of this drug, and then report the results of their own analyses, which are embodied in the following summary:—

Oil and wax	·627
Resin	1·010
Non-reducing sugar calculated as sucrose	9·457
Reducing sugar calculated as dextrose	·435
Proteids	1·944
Amido-compounds (calculated as asparagine)	1·634
Free acid calculated as formic	·360
Combined organic acid calculated as potassium formate.	1·891
Starch	11·677
Calcium oxalate	6·225
Nitrates calculated as potassium nitrate	2·408
Cellulose	16·378
Lignin, etc.	3·203
Gum, colouring matter, ash, moisture and undetermined	42·748
	<hr/> 100·000

Indications were obtained of the presence of an alkaloid, existing in the root as a salt and also in its basic condition.

Therapeutic Properties of *Rhinacanthus Communis*. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 95.) The root of this plant, applied in the form of a tincture, has been previously referred to as a remedy for ringworm (see *Year-Book of Pharmacy*, 1881, 197). A fluid extract of the drug is now recommended as a useful remedy for skin affections in general. The extract is applied without any other additions by means of a brush.

Structure of *Leptandra*. A. P. Breithaupt. (*Amer. Journ. Pharm.*, 1897, 235-240.) *Leptandra* consists of the rhizome and roots of *Veronica virginica*, belonging to the order *Scrophulariaceæ*, growing throughout the United States east of the Mississippi. The rhizome, from 4 to 6 inches in length and $\frac{1}{4}$ inch in thickness, is horizontal, somewhat bent and branched with short stem remnants or cup-shaped scars on the upper side, and beset with numerous long, straight and brittle rootlets. It is hard and breaks with a woody fracture, is almost odourless, and has a bitter and feebly acrid taste. Internally it shows a blackish bark, and a hard, yellowish circle of wood enclosing a three to six-rayed purplish pith. The roots, which may be several inches in length, are about $\frac{1}{2}$ inch in diameter, somewhat longitudinally wrinkled, purplish-brown, and break with a short fracture.

A transverse section of the rhizome shows a relatively thick bark, consisting of ordinary parenchyma, covered by a hypodermis of colenchyma and a thin corky layer, the whole being enclosed by a persistent epidermis. The inner layer of the bark shows a distinct endodermis, beneath which is found an interrupted circle of lignified fibres, constituting a sclerenchymatous pericycle. The wood is disposed in a single circle, and consists of ducts and lignified fibres arranged in more or less distinct radial rows. The pith is large, from three to six-rayed, consisting of ordinary parenchyma.

A cross-section of the root shows a very thick cortex, sharply marked off from the woody cylinder by a distinct endodermis. The cortical tissues consist of ordinary parenchyma covered by a strongly cutinized epidermis, beneath which is seen a single layer of exodermal cells. Immediately beneath the endodermis is found a single-layered parenchymatous pericycle which encloses the wood bundles.

The paper is illustrated by a number of woodcuts.

Sangol. E. Heckel and F. Schlagdenhauffen. (*Annales de l'Institut Coloniale de Marseille*, 51-76. From *Pharm. Journ.*) A root used by the natives in Senegal and the French Soudan, under

the name of "sangol," has been examined by the authors. It is referred by them to *Cocculus laëba*, is used in periodic fevers, and is very similar to *Pareira brava*, both in appearance and properties. They have found in it about 2 per cent. of pelosine and about 3 per cent. of a new crystalline alkaloid, to which they have given the name of "sangoline," which melts at 188° , and in alcoholic or chloroformic solution rotates the plane of polarisation to the right. It is thrown down by water from its alcoholic solution, and does not give the colour reaction that is obtainable with sulphuric acid and an oxidising agent from pelosine. The root also contains columbin. The plant is also mentioned by Dymock (*Materia Medica of W. India* [2], p. 33) as a common scandent shrub in the Punjab, Scinde, Persia, Afghanistan, and Arabia, and is used as a febrifuge, but it is omitted from the *Pharmacographia Indica*. In Watt's *Dict. Econ. Prod. India*, ii. p. 397, it is said, on the authority of Murray, to be used as a partial substitute for hops in the manufacture of Indian beer.

Constituents of the Root of *Raphanus Niger*. H. Moreigne. (*Bull. Soc. Chim.* [3], xv. 797-806.) The volatile products obtained in the distillation of this root with water are shown by the author to consist of a volatile oil and a new crystalline substance *raphanol*, which appears to be a lactone. The same body has also been observed by him in other *Cruciferae* (red radish, long radish, turnip, watercress, etc.). It has the composition $C_{29}H_{58}O_4$, melts at 62° C., decomposes at about 300° C., and is soluble in ether, chloroform, benzol and petroleum spirit.

The volatile oil of the root contains sulphur, but is free from nitrogen; it boils at about 300° C. and undergoes decomposition.

Commercial Gingers and Essence of Ginger. W. S. Glass. (*Pharm. Journ.*, 4th series, iv. 245; also *Chemist and Druggist*, 1897, 463.) The author has examined samples of Jamaica, Cochin, and African ginger, with a view to obtaining a satisfactory essence. His results are given in the following table:—

	Moisture.	Extract or Oleo-resin.	Ash.
Jamaica	9.33	5.00	5.3
Cochin	11.00	4.33	4.6
African	8.00	6.33	5.5

The extract was prepared by exhausting the drug with ether and evaporating at a low temperature. The African variety,

though unsuitable for many pharmaceutical purposes on account of its brown, coarse appearance, appears to yield the highest percentage of oleo-resin and the strongest essence.

For the preparation of a soluble essence possessing the full flavour of the ginger, it is recommended to add to each fluid ounce of the essence 3 drachms of powdered pumice stone and to shake occasionally during twelve hours. After this 3 fluid ounces of distilled water are gradually added, shaking after each addition, and the mixture is then allowed to stand for six hours, and finally filtered.

Amount of Oxalic Acid in Rhubarb Stems. R. Otto. (*Bied. Centr.*, xxv. 128, 129.) Rhubarb stems contain oxalic acid, not merely in the form of calcium oxalate, but also in the free state. The free acid in stems collected in May and June from a variety of cultivated plants representing a number of different species varied in proportion from 0.194–0.316 per cent. Rhubarb wine, prepared from the stems, was found to contain 0.067 per cent. of oxalic acid.

Picræna Excelsa and Quassia Amara. A. H. Hills. (*Pharm. Zeitung*, 1894, 455.) The author deals with the structural differences of the woods of Jamaica quassia (*Picræna excelsa*) and Surinam quassia (*Quassia amara*). The medullary rays in the latter consist of single rows of cells, while those in the former are composed of three rows each. The cells composing these rays in the Surinam drug are of equal size, and their radial walls appear waved in tangential sections; whereas the corresponding cells in the Jamaica drug are of variable size and exhibit regular walls in the tangential section.

Structure of Rhamnus Barks. L. E. Sayre. (*Amer. Journ. Pharm.*, 1897, 126–134.) The author has microscopically examined the structure of *Rhamnus purshiana*, *R. frangula*, and *R. californica*, and has established a few points of difference, which are, however, not sufficiently marked to serve as a means of distinguishing these barks individually in a mixture of their powders. For particulars, the reader is referred to the description and woodcut illustrations in the original paper.

Constituents of Quebracho Colorado. A. G. Perkin and O. Gunnell. (*Journ. Chem. Soc.*, September, 1896, 1303–1307.) *Quebracho colorado* is an anacardiaceous tree growing in the northern part of the Argentine Republic, the wood of which is much esteemed in commerce on account of the large proportion of tannin contained in it. According to Jean (*Bull. Soc. Chim.*,

1880, xxxiii. 6), this tannin is not identical with that of oak bark or chestnut wood. Arnaudon has shown that the drug also contains a colouring matter giving a fine yellow dye; but this substance has hitherto not been further investigated. The authors have now isolated and examined this constituent, and find it to have the composition $C_{13}H_{10}O_6$, and to be probably identical with *fisetin*, the colouring matter of young fustic (*Rhus cotinus*). They also find the wood to contain *ellagic acid*, $C_{14}H_{10}O_{10}$, or $C_{14}H_8O_9 \cdot H_2O$, a substance which is known to occur also in myrabolans, oak bark and divi-divi.

Lunasia Amara (*Rabelaisia Philippinensis*). P. C. Plugge. (*Archives de Pharm.*, ii. 537-555.) The bark of the "abuhab" tree, which belongs to the *Rutaceæ*, is used by the natives of the Philippine Islands for the preparation of an arrow poison. The author has isolated from it a poisonous glucoside resembling digitalin in its physiological action. It forms deliquescent crystals readily soluble in water and alcohol, and more difficultly soluble in chloroform. A number of reactions are described.

The arrow-poison obtained from this bark is also reported upon by C. Gärtner (*Pharm. Rev.*, xiv. 164), who states that, like "dajaksch" used in Borneo, and "upas antiar," it owes its fatal action to a direct effect on the ganglia of the heart. It is extracted from the bark by means of water.

Constituents of the Bark of Myrica Nagi. A. G. Perkin and J. J. Hummel. (*Journ. Chem. Soc.*, August, 1896, 1287-1294.) *Myrica nagi*, also called *M. sapida*, *M. integrifolia*, *M. rubra*, etc., belonging to the *Myricaceæ*, is the box-myrtle or *yangmæ* of China. It is an evergreen dioecious tree possessing an aromatic odour, and is met with in the subtropical Himalayas from the Ravi eastwards, also in the Khasia Mountains, Sylhet, and southwards to Singapore, and distributed to the Malay Islands, China, and Japan. The bark is exported from the North-West Provinces to other parts of India, and is known in Bombay under the name of *kaiphal*. It is used for tanning, dyeing, and medicinal purposes. It has an astringent taste, and in the powdered condition acts as an irritant on the mucous membrane of the nostrils. The powder is stated to be applied as snuff in catarrh with headache.

The authors have chemically examined this bark, and have found it to contain, in addition to 27.3 per cent. of tannin, 0.23-0.27 per cent. of a characteristic yellow colouring matter which crystallises in yellow needles closely resembling quercetin, and has a composition corresponding to the formula $C_{15}H_{10}O_8$.

This substance, for which the name *myricetin* is suggested, appears to be a hydroxy-quercetin, and is readily distinguished from quercetin by the colour changes it produces when dissolved in alkaline solutions. To woollen cloth, mordanted with chromium, aluminium, or tin, it imparts shades strongly resembling those obtained with quercetin and fisetin.

Culli Colorado. K. Peinemann. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 614-617.) The drug known under the name of *Culli colorado* or *Panes de vinagrillo* consists of thin round hard cakes, of a more or less reddish-black colour with a thin white coating, and of very variable size. Those examined by the author had a diameter of 9 to 22 cm. They consist of the compressed parts of one or more plants, chiefly *Oxalis rosea*, or, according to Schroff, *O. rosea* and *O. dumetorum*. Nothing definite is known about the mode of preparation of these cakes by the native Indians; but it is stated that the stems and flowers are crushed together and partly dried by heat in an iron pan, after which they are exposed to the sun until they are quite dry. The drug is used as an antiscorbutic, and for the preparation of a cooling and thirst-quenching drink. It is also used by the natives of Chili as an emmenagogue.

The author has determined the proportion of oxalic acid, which must be regarded as the active principle of the drug, and find it to amount to as much as 11·8 per cent. By way of comparison he states that fresh rhubarb stalks contain only 0·19 to 0·31 per cent. of oxalic acid; and nothing whatever seems to be known about the proportion of this ingredient in *Oxalis acetosella* and other well-known European plants containing appreciable quantities of this acid.

An aqueous infusion of the drug shows a deep red colour, emanating from the petals of *Oxalis rosea*. It is changed from red to green by the addition of ammonia. A fuller investigation of the colouring matter has shown that it differs in its spectrum, as well as in its very slight solubility in alcohol and its behaviour towards alkalies, from anthokyan, which occurs in the red and blue petals of many plants.

In addition to various parts of *Oxalis rosea* and other as yet undetermined plants, *Culli colorado* also contains stems and leaves of several grasses.

A Spurious Maranham Jaborandi. E. M. Holmes. (*Pharm. Journ.*, 4th series, iii. 2, 3.) Recent importations of Maranham

jaborandi (*Pilocarpus microphyllus*) have been observed to contain a few bales of leaves differing from the genuine drug in the absence of oil cells from their tissue, by their reticulated venation, the veinlets being usually pellucid, by not tapering to a narrow base, and by the very short hairy petiolule, about 1 mm. long. The upper surface is glossy, of a brownish-green tint, not greyish-green as in *P. microphyllus*, and the midrib on the upper surface is minutely hairy, and the lateral veins form a more acute angle with the midrib. Usually there are small rounded or oval leaflets about $\frac{1}{2}$ cm. long, mixed with the larger leaflets, which average $2\frac{1}{2}$ to 3 cm. in length; these never occur in the true Maranhão *jaborandi*. The detection of these small leaflets may therefore at once serve to the unaided eye as a guide to the presence of the spurious drug.

The author's examination of the leaves as well as of fragments of flower and fruit placed at his disposal, have enabled him to arrive at the conclusion that this spurious drug is derived from a hitherto undescribed species of *Swartzia*. This species is characterized by its leaves having four pairs of leaflets, with a terminal one, the leaflets having strongly reticulated venation, an emarginate apex, and being alternately arranged on the rachis; by the hairy ovary containing 10 ovules, the slender style as long as the ovary, the capitate stigma, and the short inflated pod, about 1 cm. long, sessile on a slender pedicel $1\frac{1}{2}$ cm. long. The author suggests that, until further and more complete specimens are procurable, the plant might be provisionally named *Swartzia decipiens*.

Jaborandi and its Alkaloids. B. H. Paul and A. J. Cownley. (*Pharm. Journ.*, 4th series, iii, 1, 2, and 437.) Though *jaborandi* is defined in the British Pharmacopœia as the dried leaflets of *Pilocarpus pennatifolius*, the drug met with in commerce, under the name of *jaborandi*, is frequently, in part, the produce of other species of *Pilocarpus* and, in some instances, even of plants belonging to another genus. But little is known of the nature of the basic constituents of these different drugs, and the discrepancies in the descriptions given of pilocarpine suggest a doubt whether the alkaloid referred to is always the same substance. In view of these facts the authors have extracted and examined the alkaloid from the leaves of various species of *Pilocarpus*, and have obtained the following results :—

	Total Alkaloid Per cent.	Crystallisable Nitrate Per cent.	Recrystallised Nitrate.	Melting Point.
<i>Pil. spicatus</i> . . .	0.16		{ .03 .04	151.5° 130.5°
„ <i>trachylophus</i> . .	.4	.02	{	
„ <i>jaborandi</i> . . .	.72	.67 (161° m.p.)	{ .37 .30	162.7° 158.3°
„ <i>microphyllus</i> . .	.84	.45 (160° m.p.)	{ .23 .22	162.7° 147.7°

A sample of reputed *jaborandi* leaves was found on examination to contain—

Leaves of <i>Pilocarpus jaborandi</i> . . .	12
„ „ „ <i>trachylophus</i> . . .	38
Stalks	50
	<hr/> 100

On analysis it yielded 0.13 per cent. of alkaloid, rather more than half of it being convertible into crystalline nitrate, which was separable by recrystallisation into portions melting at 157.7° and 147.7° C.

Commercial samples of pilocarpine nitrate were also found to show notable variations in their melting points, and a similar want of homogeneity was observed in specimens of the hydrochloride. The conclusion is therefore justified that the pilocarpine salts as met with in commerce contain mixtures of several bases, and there is consequently some uncertainty as to which of those bases possesses the medicinal action peculiar to *jaborandi*. The authors point out that it is still an unsettled question whether the alkaloids hitherto described are natural constituents of the leaves or products of the alteration of pilocarpine. While some investigators regard pilocarpine and pilocarpidine as bases pre-existing in the leaves, and jaborine and jaboridine as products of change, others dispute the presence of pilocarpidine as such in the drug, and question the existence of jaboridine as a distinct substance. The definition of all these bases is still very defective. The authors therefore intend to operate upon larger quantities of definitely authenticated material in order to throw further light on the principles obtainable from *jaborandi*.

Constituents of Aracati Jaborandi (*Pilocarpus Spicatus*). A. Petit and M. Polonovski. (*Journ. de Pharm. et de Chim.*,

1897, 369.) The authors have chemically investigated this drug described by Holmes, and have isolated from it two alkaloids distinct from pilocarpine and jaborine. One of these, "*pseudo-jaborine*," is taken up by chloroform from alkaline solutions, and forms a colourless, strongly alkaline syrup, which is miscible with water and alcohol and yields a nitrate crystallising in large thin lamellæ. This salt melts at 158° C., and is readily soluble in water but difficultly so in absolute alcohol. The hydrochloride forms small prisms melting at 222° C. The second base, "*pseudo-pilocarpine*," possesses the properties of pilocarpine, but has no action on polarized light. Its nitrate crystallises in small needles which melt at 142° C., and are somewhat more soluble in alcohol than the nitrate of pseudojaborine; the hydrochloride forms small prisms, very difficultly soluble in water and alcohol, and melting at $188-189^{\circ}$ C.

Adulterants of Jaborandi. A. Schneider. (*Journ. Pharmacol.*, iv. 141. From *Pharm. Journ.*) The author shows that certain differential characters of true and false jaborandi leaflets can readily be recognised when the leaflets are in the powdered state, whether mixed or not. No. 80 to 100 powder should be mounted in a mixture of equal parts of glycerine and water, or of the same with alcohol. Pernambuco jaborandi (*Pilocarpus jaborandi*) is recognised by the large size of its epidermal cells; Rio jaborandi (*P. selloanus*) has smaller epidermal cells, and differs from other varieties in having no sphæro-crystals or other epidermal cell contents, and no long curved hair cells or resin cells; Paraguay jaborandi (*P. pennatifolius*) contains markedly reddish-brown resinous substances in the various tissue elements and coloured guard cells; Aracati jaborandi (*P. spicatus*) has its epidermal cells filled with sphæro-crystals and resinous substances; Ceara jaborandi (*P. trachylophus*) is characterised by long palisade cells and numerous long sickle-shaped hair-cells on the lower surface of the leaflets, with a few shorter ones on the upper surface; Maranham jaborandi (*P. microphyllus*) has guard cells and companion cells filled with yellowish granular contents, whilst the contents of the resin cells are of a dark olive colour; false Maranham jaborandi (*Swartzia decipiens*) is recognised by the wavy outlines of the vertical walls of the epidermal cells.

Histological Characters of Alexandrian and Indian Senna. L. E. Sayre. (*Amer. Journ. Pharm.*, Nov., 1896, 585-592, and June, 1897, 289-306.) The author's research was undertaken

chiefly with the object of establishing the means for distinguishing the two kinds of senna in powder. Alexandrian senna is more hairy than Indian, a mixture of equal parts of the two in No. 60 powder containing ten hairs of the former to one of the other variety. The hairs of Alexandrian senna have a sharp curve near the base, while those of Indian senna are straighter, shorter, and stouter. Almost invariably the hairs of both kinds remain unbroken when the drug is powdered, and these distinctions may therefore be of practical value. The epidermal cells also differ in form, those of Indian senna being somewhat smaller and more uniform in size, whilst the angles are more acute than in the Alexandrian variety. Careful measurement of the cells gives the following average results:—Indian senna, 35 micromillimetres in diameter; Alexandrian senna, 40 micromillimetres.

On the strength of his observations the author gives the following directions for the practical recognition of the two kinds of senna in powder, and for distinguishing them in mixtures of the two:—Take a portion of the No. 60 powder and place it in a small homœopathic vial, and add to it twice its volume of a mixture of water and glycerine in equal parts. Thoroughly shake this mixture, and while still turbid with the suspended powder, place a drop on each of several glass slips, and cover with cover-glasses. If air bubbles or too great opacity exist, heat to boiling over a spirit lamp. Search for hairs showing the tips present, and if they appear abundant, one to four in each field of a $\frac{1}{4}$ -inch objective, Alexandrian senna is present. To further confirm this, examine several fragments of the normal epidermis for the stomata. If many are found that are quite round in outline, the presence of Alexandrian senna is assured. As confirmatory of this, the number of hair scars upon the epidermal fragments may be considered. These should be found frequently at a distance of from two to five epidermal cells apart. A sample of Indian senna, on the contrary, will exhibit few hairs, often none in the field, and the great majority of the stomata will be found with the long diameter much longer than the short one. The hairs should not frequently be closer than five epidermal cells apart. In simple powders the mere number of hairs present will at once distinguish between the two sennas, but in cases of mixtures of the two, the shape of the stomata will have to be examined. Many of the elongated oval form always indicate the presence of Indian senna.

Powdered senna, adulterated with chestnut leaves, may be

examined under a microscope and the adulteration detected by the presence of the tracheids and pitted cells which compose the midrib of the chestnut leaf. The finding of bundles of these fibres in senna powder is good evidence of adulteration. Occasionally, fragments of these wood cells may be found in senna powder, but they are rare.

Therapeutic Properties of Birch Leaves. Prof. Winternitz. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 144, from *Pharm. Zeitung*.) The leaves of *Betula alba* are found by the author to be a very efficient and perfectly harmless diuretic. They should be gathered in the spring and dried in thin layers in an airy, dry, and dark place. They are administered in the form of an infusion made of 25-35 grammes of the dried leaves and 200 grammes of boiling water, allowing the mixture to stand for 1 to 2 hours. A quantity such as this is given once or twice a day.

Constituents of Duradinha (*Palicourea Rigida*). C. G. Santesson. (*Archiv der Pharm.*, 235, 143.) The leaves of this Brazilian Rubiaceous plant are credited with diuretic and diaphoretic properties and are used in the treatment of dropsy and secondary syphilis. The fresh leaves are regarded as poisonous. Peckolt, in 1866, isolated from the plant a non-volatile alkaloid and three organic acids, one of which proved to be highly toxic. The author of the present paper, in a preliminary notice, confirms the existence of a very slightly toxic alkaloid in this drug, and finds that the extract from which the alkaloid has been removed is still strongly poisonous; but he has not yet been able to carry his investigation further for want of material. For the present he is inclined to think that the peculiar digitalis-like action of the drug is due to hitherto unknown constituents.

The Composition of Sage Brush (*Artemisia Tridentata*). G. H. Maghee. (*Amer. Journ. Pharm.*, 1897, 152, 153.) The sage brush, or sage bush, is a small shrub, 5 or 6 feet in height, which grows abundantly on the Western plains, covering hundreds of square miles on the foot-hills of Nevada and Utah, and extending from Arizona to Oregon and Sonora, and as far east as Nebraska. Besides being employed as a fuel, an infusion of the leaves is used by the natives for colds, headache, and mountain fever.

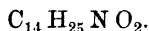
The author has made an analysis of the leaves and flower heads, and obtained the following results:—

	Per Cent.
Moisture	8.48
Ash	4.92
Petroleum ether extract, containing volatile oil 0.84, fixed oil and fat 0.41, wax melting at 61° C. 0.61, and caoutchouc 0.26	2.12
Ether extract, consisting of resins	4.25
Absolute alcohol extract, containing resins, glucosidal bitter principle, etc.	3.32
Water extract, composed of mucilage 3.22, glucose 0.52, extractive 4.90	8.63
Alkali extract, containing pectin 2.74, extractive 3.36	6.10
Acid extract	1.14
Lignin	6.44
Cellulose	54.60
	<hr/> 100.00

The alcohol extract yielded a bitter amorphous principle by treating with acidulated water and agitating this solution with ether or chloroform.

Constituents of the Leaves of *Citrus Vulgaris*. E. Jahns. (*Ber. der deutsch. chem. Ges.*, 1896, 2065–2068.) The leaves of the bitter orange, *Citrus vulgaris*, contain, in addition to volatile oil, a bitter principle and various ordinary plant constituents, several organic bases, one of which resembles betaine and is present in much larger proportion than the others. This constituent is found by the author to be identical with “stachydrine,” a base discovered by A. von Planta and E. Schulze in the tubers of *Stachys tubrifera*.

Carica Papaya. M. van Rijn. (*Hed. Tjd. voor Pharm.*, ix.; *Pharm. Journ.*, 4th series, iv. 466, 467.) The author alludes to the method employed by the Indians in preparing from the leaves of this plant an extract containing the bitter principle. The main portion of his paper deals with the alkaloid “carpaine,” which is said to surpass quinine in its antipyretic properties and also to have a marked cardiac action. The composition of the base is found to correspond with the formula—



In addition to this alkaloid, a glucoside, “carposide,” was also isolated from the leaves.

Constituents of Sicilian Sumach, *Rhus Coriaria*. A. G. Perkin and G. Y. Allen. (*Chem. News*, lxxiv. 120.) Sicilian sumach leaves contain a large proportion of tannin (identical with

gallotannic acid), and a yellow colouring matter which Löwe believed to be quercitrin. The authors have isolated and examined this constituent, and find that it has the composition $C_{15}H_{10}O_8$, and is identical with *myricetin*, the colouring matter of *Myrica nagi*.

Guava. M. Khouri. (*Ann. de l'Institut Coloniale de Marseille*, 81 and 154. From *Pharm. Journ.*) The leaves of this plant have been examined by the author, who finds that their astringent properties are due to tannic and gallic acids, which, together with the essential oil contained in the leaves, accounts for their use as a remedy in diarrhoea and dysentery, and in dyspepsia.

Formation of Mannan in Amorphophallus Konjak. M. Tsukamoto. (*Bull. Coll. Agric. Imp. Univ. Tokyo*, 1897, 406-408. From *Journ. Chem. Soc.*) The leaves of this plant were found to contain very little starch, but in all parts of the leaves a very slimy substance (an anhydride of mannose) was observed. This, when boiled, loses its slimy character, and separates in a flocculent form; it agrees in all essential properties with Kinoshita's soluble mannan. Neither pentosans nor galactans were found in the stalks and leaves.

In order to ascertain whether mannose, as such, is present in the stalk and blade, these were extracted with 50 per cent. alcohol, which would dissolve the sugar, but not the mannans. Only the extract from the stalk yielded any appreciable quantity of precipitate with phenylhydrazine acetate; in the case of the extract of the blade, there was a doubtful trace. The stalk seems also to contain glucose or fructose, or both.

The fact that the slimy mannan occurs in the leaf cells makes it probable that, to some extent, it plays the rôle of starch in this plant; but it is at present impossible to say whether mannose is the first product of assimilation. The presence of mannose as such in the stalks is of interest, as it has not before been observed in plants.

Assay of Coca Leaves. A. Gunn. (*Pharm. Journ.*, 4th series, iii. 249, 250.) The author has compared the various methods in use for the estimation of the alkaloids in coca leaves, and has found them to give discordant results. Lyon's process, which is found to effect the complete extraction of the alkaloids, has the disadvantage of requiring 24 hours to carry out. Equally good results can, however, be obtained in about two hours by the following modification:—

Five grammes of the powdered leaves are damped with a weak solution of ammonia (about 2 per cent.) and allowed to stand for half an hour. They are then placed in a narrow tubular percolator (10 inches long and of $\frac{1}{2}$ -inch bore) and percolated with ammoniated ether until 100 c.c. have collected. This is shaken out with three washings of a 2 per cent. solution of hydrochloric acid, collecting about 50 c.c. of the washings. This acid solution is now washed once with ether, then made alkaline with ammonia, and the alkaloid shaken out with three washings of ether. The collected portions of ether are transferred to a weighed porcelain dish, the ether blown off, and the residue dried at 75° C.

Average result by this method, 0.572 per cent.

Average result by Lyon's method, 0.574 per cent.

Adonis Æstivalis. N. Kromer. (*Archiv der Pharm.*, ccxxxiv. 452-458.) The alcoholic extract of this plant was successively treated with light petroleum, ether, and chloroform, the latter of which extracted from it a new bitter glucoside of the composition $C_{25}H_{40}O_{10}$. It amounted to 0.22 per cent. of the weight of the plant, and was obtained as a yellow amorphous substance soluble in water. Its physiological action resembles that of the adonidin of *Adonis vernalis*, but is less marked.

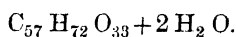
Urtica Urens and Urtica Dioica. E. Giustiniani. (*Gazzetta*, xxvi. 1-7.) The author has examined *Urtica urens* and *Urtica dioica* with the object of determining to which constituents they owe their powerful hæmostatic action. No alkaloids could be extracted from the plants, either before or after flowering. The freshly expressed juice of the nettles collected before flowering has occurred gives off nitrous fumes when heated or distilled, but the amount of such vapours evolved diminishes greatly as the plant reaches maturity, and the aqueous extract of the dried plant gives off no such fumes on distillation; this behaviour is probably due to the simultaneous presence of formic acid and nitrates in the plant juices. The nettle seems to contain a glucoside, which readily undergoes hydrolysis with formation of one or more volatile acids.

Juar (Andropogon Sorghum). (*Agricultural Ledger (India)*, 1896, No. 26; *Pharm. Journ.*, 4th series, iii. 380.) The juar plant, used as fodder in the Punjab, is shown to owe its occasional toxic action to the presence of a very large amount of potassium nitrate, and not to a fungus or an insect as is generally

supposed by the natives. In very dry seasons this nitrate seems to increase in the stem to an enormous proportion.

Robinia Nicou. E. Geoffroy. (*Pharm. Journ.*, 4th series, iii. 292, from *Annals de l'Institut Coloniale de Marseille*.) The author has examined this plant, which is used in French Guiana as a fish poison. Its properties are found to be due to a crystalline substance, which he has named "nicouline." It is neutral to test paper, has the formula C_3H_4O , a melting point of 162° , and is not a glucoside. It dissolves in alkaline solutions, and is precipitated from them unaltered by acids, is soluble in less than its own weight of chloroform, and in about three times its weight of benzol, but is only slightly soluble in water. Its physiological action shows that it is an excitant of the spinal cord, of which it exaggerates the reflex action. Death appears to result from paralysis of the respiratory centres.

Plumiera Acutifolia. C. E. Merck. (*Chem. Centr.*, 1896, 561.) The author has isolated from the alcoholic extract of this plant a bitter crystalline principle which is not identical with "plumieride" obtained by Boorsma. It melts at $157-158^\circ C$, and has a composition corresponding to the formula—



Fumaria Parviflora as a Remedy for Skin Diseases. (*Pharm. Zeitung*, xlii. 107.) This plant possesses purgative and diuretic properties. The aqueous extract is now recommended in doses of 0.5–2.0 grammes as a specific for leprosy, cancer, eczema, and similar diseases.

Parthenium Hysterophorous. H. V. Arny. (*Amer. Journ. Pharm.*, 1897, 169–180.) The author has isolated from this composite plant about 1 per cent. of a crystalline constituent, which proved to be neither an alkaloid nor a glucoside, but a substance somewhat analogous to santonin. No alkaloid could be detected. His results throw some doubt on the existence of the base described under the name of parthenine by J. R. Tovar (*Ph. J.*, 3rd series, xv. 987). The main portion of the paper is devoted to a botanical and structural description of the plant, illustrated by woodcuts.

Senecio Jacobea and S. Vulgaris as Emmenagogues. (*Bull. Gén. de Thérap. Sect. Pharmacol.*, i. 438, and *Nouv. Rem.*, xii. 422. From *Pharm. Journ.*) The action of various species of *Senecio*, but chiefly *S. jacobea* and *S. vulgaris*, have been investigated by Dalché

and Heim, and independently by Bardet and Bolognesi. In each case the solid extract advocated by the former authors was employed; this is obtained by extracting the whole plant, roots as well as aerial portions—since the alkaloids exist only in the former—first with water, and then with alcohol, mixing the extracts and evaporating to a pilular consistence on the water-bath. This solid extract was given in doses of 20 to 40 centigrammes as a pill or bolus. Both investigations prove that the extract is an efficient emmenagogue, and at the same time perfectly harmless in ordinary doses; the dose may be gradually increased from 25 centigrammes up to as much as 5 grammes per diem. If too large a dose be given at first, utero-ovarian congestion, attended by pain, is observed, indicating that in excessive doses the drug may act as an abortifacient, but in ordinary quantities it appears to be absolutely safe. It is without influence on the pain occasioned by dysmenorrhœa.

Contribution to the Knowledge of some North American Coniferae E. S. Bastin and H. Trimble. (*Amer. Journ. Pharm.*, 1896, 383-386, 409-422, 554-566, 642-648, and 1897, 90-97.) This series of contributions comprises reports on the general characters, the microscopical structure, and the chemical composition of the following plants:—*Picea alba*, *P. nigra*, *P. pungens*, *P. excelsa*, *Abies balsamea*, *A. fraseri*, *A. nordmanniana*, and *Tsuga canadensis*. For particulars, reference should be made to the original papers.

Leucadendron Decurrens. E. M. Holmes. (*Pharm. Journ.*, 4th series, iii. 545.) The botanical source of the active principle described under the name proteacin being somewhat doubtful, the author has obtained from J. Meiring specimens of the plant from which the proteacin was originally prepared. The plant proves to be *Leucadendron decurrens*, a species with lanceolate, spatulate, sub-decurrent and glabrous leaves, with the calyx of the male flowers wholly glabrous, and that of the female flowers with a hairy tube and a glabrous limb. In *L. concinnum*, the plant referred to by Merck (*Year-Book of Pharmacy*, 1896, 118), the leaves are lanceolate oblong, the calyces hairy, and the twigs hairy near the apex. The leaves also are only about half the width of those of *Leucadendron decurrens*.

Yerba del Pollo. A. Herrera. (*Amer. Journ. Pharm.*, 1897, 290-294.) Several plants of the family *Commelinaceæ* are known in Mexico by this name, and are to be found in cold as well as

in warm and temperate regions. They grow on the sandy banks of rivers and brooks, and flourish from July until September. *Commelina tuberosa*, Linn., *C. parviflora*, Reichl., and *C. undulata*, Lodd., are mentioned as sources of the drug, which is known under the following synonyms:—Matlaliztic, Coapatli, Zoyol, Xochitl, Yerba del Pollo, and Rosilla. The fresh juice of the plants is used in the form of an extract as a hæmostatic in the treatment of metrorrhagia and hæmoptysis. The extract is given in doses of one or two grains in pills about every hour. Injections are also made by dissolving 1 drachm in a pound of water. In wounds, cataplasms may be made from the powder of the plant, or a concentrated solution of the extract may be applied by means of lint. Injections have also been employed in cases of uterine cancer, and in leucorrhœa accompanied with chlorosis. The chief therapeutic use of the drug, however, is as a hæmostatic.

The author has made a chemical examination of the extract, which he finds to contain ammonium acetate, potassium chloride, albuminoids, vegetable albumin, chlorophyll, extractive and cellulose. The juice was also found to contain free acetic acid. He attributes the physiological action of the drug to the proteïd principle contained in it.

Geissospermum Vellosii. T. Peckolt. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 889-891 and 913-917.) The author has obtained the following yields of pereirine from various parts of this Brazilian apocynaceous plant:—

	Percentage of Pereirine.
Inner bark of lower stem	1·955
„ „ „ upper stem	2·720
„ „ „ thick branches	1·957
„ „ „ thin branches	0·700
„ „ „ small twigs	0·409
Fresh leaves	1·333
Fresh fruit	0·047

For other details of the author's analyses the original paper should be referred to.

Periploca Græca. E. Lehmann and M. Burshinsky. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 74.) The authors have isolated from this Indian plant a glucoside, *periplocin*, possessing the characters of a cardiac poison similar in its action to digitalin, strophanthin, and ouabain. It forms colourless crystals of the

composition $C_{30}H_{48}O_{12}$, which melt at $205^{\circ}C.$, are readily soluble in alcohol and very difficultly soluble in ether. It dissolves more freely in cold than in hot water.

The authors consider that periplocin merits further investigation with regard to its value as a therapeutic agent.

Chelidonium Majus in the Treatment of Cancerous Tumours. M. Denissenko. (*Bull. Com.*, xxiv. 426. From *Pharm. Journ.*) The author has employed the extract of greater celandine with remarkable success in the treatment of cancrroid growths. He gives internally from 1·5 up to 5 grammes daily of the extract, dissolved in water or peppermint water; at the same time he injects into the tumour, at the limit of the neoplastic and healthy tissues, a mixture of equal parts of the same extract, of glycerine, and of distilled water. About a cubic centimetre is employed each time, distributed into several punctures. Lastly, the surface of the neoplasm where it is ulcerated is painted twice daily with a liquid composed of 1 or 2 parts of the extract, and 1 part of glycerine. The internal use of the extract is generally well borne, and the local applications only occasion a passing smarting. The injections, however, besides a smarting sensation, occasion a sensation of weakness, shivering, and a rise of temperature to 38° or $39^{\circ}C.$ These phenomena commence in fifteen to thirty minutes after the injection, and disappear by the next day. These injections therefore require to be cautiously given and regulated according to the susceptibility of the patient. According to the author, the therapeutic action of the treatment is manifest in a few days. In three or five days fistulas appear in region of the punctures, around which the tumour rapidly disintegrates. In fifteen to twenty-five days a line of demarcation appears between the neoplasm and the healthy tissues, the volume of the tumour diminishes to one half, and the swelling of the neighbouring lymphatic ganglia disappears.

In a subsequent paper (see *Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 794), the author states that he is engaged in an investigation of the action of the expressed juice of the plant in similar cases.

Monsonia Ovata. J. Maberly. (*Lancet*, 1897, 368, and *Bull. commerc.*) The *Monsonia* species belong to the *Geraniaceæ*, and are used in South Africa for dysentery. According to the author, a tincture of the flowering plant of *Monsonia ovata* made in the proportion of $2\frac{1}{2}$ ounces to the pint of rectified spirit, and given in

doses of 2 to 4 fluid drachms daily, has proved very efficient in this malady.

In a note on this subject (*Pharm. Journ.*, 4th series, iv. 450), J. M. Wood states that the plant pointed out to him by residents in the Orange Free State as the one used for dysentery was *Monsonia biflora*, and not *M. ovata*.

New Drugs. Gehe & Co. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 180, 181, from *Chem. Zeitung*.) *Helicteris Isora*.—The fruit of this East Indian plant belonging to the *Sterculiaceæ* consists of five angular dark brown seeds free from endosperm, and is stated to be employed in diseases of children.

Holarhena antidysenterica.—This drug consists of seeds, 1·5 cm. in length, somewhat resembling oat grains, and covered with a thin coating, the outer layer of which consists of yellow-walled papillous cells. The cellular tissue next to this consists of several layers, and contains fixed oil, proteid substances, and starch. The principal part of the seed is the embryo which, in addition to the substances named, contains an alkaloid, "conessin." The drug possesses vermifuge and antipyretic properties.

Hydnocarpus species.—The seeds occurring under the name "Kowti seeds" are 20–25 mm. long and 10–12 mm. broad, and contain a large embryo, an endosperm rich in oil, and a thin testa. They are employed in India in leprosy and other skin diseases.

Moringa pterigosperma.—The seeds of this plant yield a valuable fatty oil, known as "Ben-oil," which never becomes rancid.

Salvadora oleoides.—This plant (order *Salvadoraceæ*) occurs plentifully in Afghanistan and the Punjaub. The seeds yield a pale greenish fat which is used as a stimulant.

Sapindus trifoliatus.—The fruits of this tree (belonging to the *Sapindaceæ*) have globular, black, very hard seeds about 10 mm. in diameter. The epicarp is rich in saponin, which is insoluble in alcohol and is coloured yellow by sulphuric acid, then reddish-brown, and finally violet. The drug is known in India by the name "soap-nuts," and is used as a substitute for soap, and therapeutically as an anthelmintic. The saponin contained in the fruit amounts to 4·5 per cent. The cotyledons contain 30 per cent. of fat.

Psidium Guajava.—The bark of this plant is used in India as an astringent in diarrhœa. It is pale brown or greyish-brown externally and reddish-brown internally, and is rich in tannin.

Berberis Asiatica.—The bark of this Indian plant, known as "Aristata bark," has an intense yellow colour, and contains in

nearly every part numerous stone cells which are entirely absent in ordinary berberis bark. It does not resemble the latter in any respect.

Plumbago ceylanica.—The root of this plant is used for a variety of therapeutic purposes.

Notes on Brazilian Medicinal Guttiferæ. T. Peckolt. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 416.) *Calophyllum pachyphyllum* and *C. brasiliense*.—The seeds of these plants yield an oil which is applied for burns and rheumatism. The balsameous exudation from the stems is an external remedy employed in a variety of affections.

Caraspa grandifolia.—The oil of this tree (*Oleo de Tamakoaré*) is used as an application to wounds and for rheumatism; the bark as an astringent and likewise as an application to wounds, and the leaves internally against colic. A balsameous oil exudes also from incisions in the stem of several other species of *Caraspa*.

Hypericum connatum.—This is a shrub, the leaves of which are used in the form of a decoction as a tonic, astringent, and for gargles; the expressed juice is employed as an application to wounds.

Hypericum laxiusculum.—The leaves and juice are applied to wounds; also internally and externally for snake-bite.

Hypericum brasiliense and *H. teretius* are both used in the form of decoctions as an addition to baths.

Kielmeyera rosea.—A small shrub, the seeds of which, emulsified with water, are used in gonorrhœa. An infusion of the fresh flowers serves as a gargle, and the leaves as a substitute for marrow leaves.

Kielmeyera speciosa.—The flowers and leaves are used like those of *K. rosea*; the juice as a remedy for toothache.

Mahnrea palustris ("Holy Tree").—A tree about 5 metres high. The bark is used as an astringent.

Observations on the Genus Waitzia and its Species. F. v. Mueller. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 933-936.) This paper contains notices of the following Australian species of this genus:—*Waitzia acuminata*, *W. aurea*, *W. corymbosa*, *W. Steetziana*, and *W. podolepis*. For particulars, reference should be made to the above source.

Papilionaceous Plants containing Cytisine. P. C. Plugge and A. Rauwerda. (*Archiv der Pharm.*, ccxxxiv. 685-697.) The authors have examined the seeds of the plants previously enumer-

ated (see *Year-Book of Pharmacy*, 1896, 128), together with a number of others, for cytisine. This alkaloid has been found in the following 23 species belonging to this order, in addition to those already mentioned (*loc. cit.*). *Cytisus Attleanus*, *C. candicans*, *C. formosissimus*, *C. monspessulanus*, *C. ponticus*, *C. ruthenicus*, *C. scoparius*, *Ulex hibernicus*, *U. Jussiei*, *U. parviflorus*, *Genista ephedroides*, *G. florida*, *G. monosperma*, *Sophora flavescens*, *S. sericca*, *S. angustifolia*, *Baptisia alba*, *B. bracteata*, *B. exulata*, *B. leucantha*, *B. minor*, *B. perfoliata*, and *B. versicolor*. No indications of cytisine, however, could be obtained in *Cytisus æolicus*, *C. canescens*, *C. Everestianus*, *C. falcatus*, *C. pullulans*, *C. purpureus*, *C. racemosus*, *C. ramosissimus*, *C. Rochelii*, *C. serotinus*, *C. sessiliflorus*, *C. triflorus*, *Genista Andreana*, *G. canariensis*, *Sophora alata*, *S. alopecuroides*, *Baptisia leucophæa*, *Coronilla Emerus*, *C. glauca*, *Robinia pseudacacia*, *Wistaria sinensis*, *Albizia stipulata*, *Amorpha fruticosa*, *Anthyllis tetraphylla*, *Arthrolobium scorpioides*, *Caragana arborescens*, *Desmodium canescens*, *Gleditschia sinensis*, *G. triacanthos*, *Kennedyia rubicunda*, *Psoralea capitata*, and *Tetragonolobus purpureus*.

Insect Powders of Commerce. G. R. Durrant. (*Pharm. Journ.*, 4th series, iv. 505-507.) The author gives a summary of the literature of this subject, and then proceeds to discuss the results of his own work referring to the toxic constituents of the genuine powder of the flowers of *Chrysanthemum cinerariæfolium*. He considers the toxic properties of the powder as due to—

(a) A volatile oil amounting to 0·5 per cent. in picked specimens of closed flowers and much less in open flowers.

(b) A soft acid resinous body, this is the principal source of the toxic effect. It is found to the amount of 4·8 per cent. in selected closed flowers, less than 4 per cent. in half-open flowers, and still less in flowers that are fully open, the whole plant apart from the flowers containing mere traces of resin.

With regard to the quality of insect powders, the author states that the powders occurring in commerce at the present time may be divided into the following classes:—

1. Ground from closed, (a) wild, or (b) cultivated flowers of *C. cinerariæfolium*.

2. Ground from half-open or mixed half-open and open flowers.

3. Ground from damaged flowers.

4. Foreign ground, divided into grades under the terms: "closed flowers," "half-open flowers," etc., etc. Of these there appear to be many kinds, but the author has never met with one sample that was not grossly sophisticated.

The value of an insect powder is stated to be in direct proportion to the combined amount of essential oil and soft acid resin contained in it, and in inverse proportion to the amount of chlorophyll—both statements to be read together. A perfect sample of insect powder should pass a sieve having at least eighty meshes to the linear inch; the particles would be, therefore, approximately $\frac{1}{160}$ of an inch in greatest magnitude. The powder should yield 5.25 per cent. of combined essential oil and soft resin; chlorophyll should be absent or present in the merest trace. The following method of testing is recommended:—Place 100 grains of the powder in a 1 oz. glass syringe, press it down compactly on to a piece of absorbent cotton acting as a filter, and then moisten with ether of 0.735 sp. gr. Close the top of the syringe, and macerate for 30 minutes; percolation may then proceed, the powder being repercolated with the same fluid four times, and finally washed through with sufficient ether to make up one fluid ounce. The resulting percolate should be of a rich yellow colour; if a pronounced green colour be the result, the sample may be discarded at once. In the absence of much green colouring matter, the fluid may be carefully evaporated at a temperature not exceeding 200° F., and the residue weighed in a tared watch-glass. The resulting soft mass should not weigh less than 3.75 grains, and in the finest samples may reach 5.5 grains, and should have the pleasant and characteristic odour of the flowers.

Passion Flower (*Passiflora Incarnata*), in **Epilepsy and other Neuroses**. S. D. Bullington. (*Amer. Journ.*, from *Nashville Journ. Med. and Surg.*, March, 1897.) A fluid extract of the passion flower has been administered with very favourable results in epilepsy, hysteria, neurasthenia, and insomnia. The remedy is stated to be an admirable substitute for bromides, and to be free from any injurious effects.

Datura Alba. F. Browne. (*Pharm. Journ.*, 4th series, iii. 197.) The flowers of this plant are much used amongst the Chinese as a medicine. The fresh leaves are applied to relieve pain. An infusion of the dried flowers is taken for convulsions, and for diseases in which a soporific is required. It is also given as a soothing medicine to children. In larger doses it acts as a stupefying agent, and is often used as such in China for criminal purposes.

The author has chemically examined the flowers, and has isolated from them an alkaloid which he finds to be identical in every respect with pure hyoscyne. In addition to this the flowers

contain a large proportion of a fragrant resin which is at present under investigation.

Anti-Malarial Properties of the Sunflower (*Helianthus Annuus*). M. Moncorvo. (*Pharm. Journ.*, 4th series, iv. 58, from *Rio de Janeiro Centr. f. Therap.*) As a substitute for quinine, which is difficult to administer to young children, the author has found the alcoholic extract of the flowers and leaves of *Helianthus annuus* to have a prompt and general anti-malarial action. The dose is from one to six grammes in the twenty-four hours. No unpleasant after-effects were observed.

Anthelmintic Properties of Reseda Odorata. (*Rev. Med. Pharm.*, iii. 75, and *Pharm. Journ.*) The flowers of the mignonette are reputed to possess anthelmintic properties. A strong decoction of the flowers, followed by a dose of castor oil, has proved successful as a tænicide.

Histology of Mace. A. Schneider. (*Journ. Pharmacol.*, iv. 57. From *Pharm. Journ.*) The author has made a comparative study of true or Banda mace (*Myristica fragrans*) and wild or Bombay mace (*M. malabarica*). He finds that their anatomical characters are essentially different, the most marked differences occurring in the epidermal tissues and in the amylo-dextrin grains. The epidermal cells of true mace are described as being much elongated in the direction of the long axis of the arillus and tangentially flattened; those of Bombay mace, on the other hand, are radially flattened. The amylo-dextrin grains of true mace vary greatly in size and form, some ($5\mu \times 14\mu$) being nearly rectangular and much elongated, whilst others ($6\mu \times 9\mu$) are irregularly oval, and some are very small (2μ to 6μ in diameter). Others, again, are much thickened at one end (flask-shaped), and in most of the grains crystalloid bodies may be detected. The amylo-dextrin grains of Bombay mace are usually more or less spheroidal, some being quite irregular, and very frequently they occur in groups. They vary from 2μ to 10μ in diameter, and their crystalloid contents seem much smaller than those in true mace. In addition the contents of the oil-cells of the two kinds of mace differ chemically, those of the Bombay variety being distinguished by a colouring substance which does not occur in appreciable quantities in true mace, if at all. On the addition of potash solution the cell contents are dissolved and an orange-red colour gradually develops in the presence of this substance, the reaction requiring from one to three minutes to reach its maximum intensity. If sulphuric acid (25 to 50 per

cent.) be now added the colour changes to yellow, and there is a partial precipitation of the colouring substance. This reaction is said to be a certain proof of the presence of Bombay mace, as true mace when treated with alkalis gives only a "light" orange-red coloration which is changed by acids to a "faint" yellow. It is claimed that the presence of an almost infinitesimal quantity of wild mace can thus be detected, and that by the aid of the microscope, mixtures of the two kinds in the state of powder can be recognised as such.

Contribution to the Knowledge of Strychnos Drugs. G. Sander. (*Archiv der Pharm.*, 235 [2], 133.) In the author's investigation of the seeds of *Strychnos nux vomica* and *Strychnos Ignatii*, Keller's process for the estimation of the total alkaloids was found to be the most satisfactory, and to yield a white crystalline product without any admixture of impurity. For the determination of the relative proportions of strychnine and brucine, he gives preference to the method consisting in the destruction of the brucine with potassium permanganate and the estimation of the strychnine by difference. His results reveal the interesting fact that in either of the two drugs there seems to be a simple and constant proportion in the relative amounts of the two alkaloids. The variations in this ratio are but slight, and it may be assumed that in *nux vomica* and its preparations the total alkaloid consists of about equal molecular weights of strychnine and brucine, while in the total alkaloid from *St. Ignatius* beans the ratio is about one molecular weight of brucine to two molecular weights of strychnine.

The so-called "igasuric acid" obtained from both drugs was found by the author to be identical with caffeotannic acid.

Assay of Nux Vomica. C. C. Keller. (*Schweitz. Wochenschr.*, xxxiii. 452.) The author suggests the following modification of the process previously described by him (*Year-Book of Pharmacy*, 1895, 140):—Twelve grammes of the powdered sample are introduced into a flask of 200 c.c. capacity, and shaken with 80 grammes of ether and 40 grammes of chloroform; after half an hour 10 c.c. of 10 per cent. ammonium solution are added, and the whole is shaken at intervals for half an hour. 15 to 20 c.c. of water are now added, the mixture is again well agitated, and, after separation, 100 grammes of the ether chloroform solution are shaken with 50 c.c. of 0.5 per cent. hydrochloric acid, the shaking being repeated with another 25 c.c. of acid of the same strength. The acid liquid is drawn off, mixed with an excess of ammonia, and agitated three successive times with a mixture of 30 c.c. of chloroform and

10 c.c. of ether. This, on evaporation, yields the alkaloids from 10 grammes of the drug.

Strophanthus Seeds. S. E. Jeliffe. (*Amer. Journ. Pharm.*, September, 1896.) The author discusses the reasons for believing that biological changes have taken place in the case of this drug, and that there exists a regular gradation from the small brown seed of *Strophanthus hispidus*, through the seed of *S. gratus* and *S. asper* to the long green seed of *S. Kombé*.

Distinguishing Characters of Strophanthus Seeds and the Seeds of Kickxia Africana. P. Siedler. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 398.) The author directs attention to the following distinguishing characters by which a fraudulent admixture of kickxia seeds may be readily detected in strophanthus seeds with the aid of an ordinary lens:—The seeds of kickxia are spindle-shaped, not flat, have no hairs, and taper equally at base and apex. Strophanthus seeds, on the other hand, always show hairs or the remnants of such; they are distinctly flattened in shape, and have a rounded base and an acute apex. A transverse section of kickxia seeds exhibits folded cotyledons, whereas in strophanthus seeds the cotyledons are placed parallel upon each other. On treating the transverse sections with concentrated sulphuric acid, kickxia seeds assume a brown and subsequently a cherry-red colour, while the section of strophanthus seed turns green.

The foregoing statements respecting strophanthus refer to the seeds of *S. hispidus* and *S. Kombé*.

Spurious Kola Nuts. (*Pharm. Journ.*, 4th series, iii. 380.) The spurious drug referred to, as having been sent, under the name of kola, to the London market from San Domingo, consists of kidney-shaped seeds, about 2 to $2\frac{1}{2}$ inches long, $1\frac{1}{2}$ wide, and about $\frac{3}{4}$ – $1\frac{1}{4}$ inch thick, marked transversely with a deep narrow sinus. The seed consists of two cotyledons, is apparently leguminous, and resembles closely the seeds of *Dimorphandra* (*Mora*) *excelsa*. They are said to be used in the island as food for cattle.

The same drug is also reported upon by T. H. Wardleworth (*Ibid.*, 473), who has met with it in the Liverpool market. He thinks that though the seed may perhaps belong to a species of *Dimorphandra*, this is not likely to be the *D. excelsa*, since, according to Smith's *Economic Botany*, the pod of the latter is from 7 to 8 inches long and 3 inches broad, containing one seed nearly filling the pod. The seed in question, on the other hand, is not much bigger than a large-sized kola nut.

Constituents of Kola Nuts. J. W. T. Knox and A. B. Prescott. (*Amer. Journ. Pharm.*, September, 1896.) The authors consider alcohol of 50 per cent. strength as the best menstruum for extracting kola nuts for pharmaceutical purposes.

With regard to the so-called glucoside of kola, or kolanin, they found the dilute acids to be unsuitable for the purpose of recovering completely the alkaloids from their natural combination. Lead hydrate was therefore tried, and a simple and effective process of liberating the caffeine devised. The reaction of kolanin with lead hydrate, and the observation that after chloroform had removed all the caffeine from the mixture of alkaloids, water removed nothing further, led them to infer that the glucose obtained in the decomposition of this so-called glucoside with mineral acids exists primarily in combination with a tannin-like body, and that the liberation of glucose, therefore, is not necessarily simultaneous with that of caffeine, nor in consequence of it. This was further shown by decomposing the lead compound of the red colouring matter with sulphuretted hydrogen, and thus liberating the constituent previously combined with the caffeine. The resulting product proved to have a strong astringent taste, to give all the tannin reactions with iron salts, alkaloids, gelatin, etc., and to furnish glucose on hydrolysis with dilute mineral acids. From these observations the conclusion is drawn that the so-called glucoside is a combination of caffeine (and theobromine) with a glucoside tannin. In addition to this combined tannin, kola contains free tannin, which can be removed directly from the drug by strong alcohol.

An "artificial kola-tannate of caffeine" was prepared by the following process:—An aqueous infusion of kola was poured into a 10 per cent. solution of caffeine acidulated with hydrochloric acid. The presence of acid was necessary to obtain an aqueous caffeine solution of sufficient concentration, and especially to avoid the re-solution of the tannate of caffeine which takes place in the neutral solutions in the presence of an excess of either tannin or caffeine. The copious precipitate was rapidly filtered with the aid of the pump, washed with cold water, and well drained. It was then dissolved in alcohol, and filtered to remove insoluble extraneous matter carried down in precipitation. The alcohol was then distilled off under reduced pressure until the solution had reached a syrupy consistence, and the evaporation was continued to dryness over sulphuric acid in a vacuum desiccator. The product so obtained was found to have identical properties

with the so-called kolanin. The theobromine was estimated and found to be 1.51 per cent. of the total alkaloids present.

Assay of Kola Nuts. J. W. T. Knox and A. B. Prescott. (*Amer. Journ. Pharm.*, September, 1896.) When a fresh kola seed is cut or bruised, a chemical change immediately takes place, as shown by the rapid change of colour of the cut surface from pink or cream colour to red-brown. This, the authors find, may be prevented by dropping the freshly cut slices into boiling water, or preferably into hot or boiling alcohol. The following mode of assay is recommended by them as free from the sources of error inherent in other published processes:—Cut a sufficient quantity of the fresh seeds in thin slices, allowing them to fall into a beaker of boiling alcohol. Remove the slices after a few moments' boiling, and allow them to dry spontaneously on clean glass plates. Distil the alcoholic solution, under reduced pressure, to a syrupy consistence, and pour it on the sliced drug now being dried, rinsing the flask with successive small portions of alcohol. When dry remove the drug to a mortar, wash the glass plates with a few c.c. of hot alcohol, and pour this on the drug, which is then finely powdered and preserved in dry glass-stoppered jars. (1) For determining the free alkaloids, weigh accurately five grains of the prepared sample, transfer to a Soxhlet's extraction tube, and treat for six hours, or until exhaustion is complete, with chloroform. Evaporate the chloroform, add to the residue 30 c.c. of hot one per cent. hydrochloric acid, and filter to remove fat, rinsing out the flask with several small portions of hot water, passing these through the filter, and washing the filter three or four times with hot water. The united filtrate and washings now amount to about 70–75 c.c. Concentrate in a porcelain capsule on a water-bath to about 10 or 15 c.c., transfer to a graduated cylinder, which has been carefully compared with the burette to be used for the Wagner's reagent, and rinse the capsule with three or four successive portions of hot water, making up the volume in the cylinder to 30 c.c. after cooling. Now run in from the burette 30 c.c. of standard Wagner's reagent and agitate well. Filter through asbestos after five minutes, and pour the filtrate into the same burette, previously washed and dried. About 55 c.c. will be recovered. Run out an aliquot portion of the liquid (say 30 c.c.), and neutralise the excess of iodine with decinormal sodium thiosulphate solution; then calculate from the result the number of c.c. of iodine solution used. Multiply this number by 0.00485 for the weight of anhydrous caffeine. With another

aliquot portion of the filtrate make a duplicate titration. (2) For determining the combined alkaloids, after exhaustion with chloroform, add alcohol of 90 per cent. to the drug, which is still contained in the extraction tube, and continue the treatment until exhaustion is complete, as shown by the absence of colour in the portion of menstruum last siphoned over in the apparatus. Two or three hours are usually sufficient. This alcoholic solution may be treated in either of the following ways:—(a) Evaporate the solution to dryness in a tared porcelain capsule, and weigh. Take a small portion (0.200 or 0.300 gramme), and determine the amount of nitrogen by combustion. This nitrogen is entirely alkaloidal, as proteid substances are not extracted from the drug by the strong alcohol, and the total nitrogen can be calculated into caffeine. From the amount of caffeine found by combustion of the aliquot portion, calculate the total amount present in the whole extract. (b) To the hot alcoholic solution add an excess of freshly precipitated lead hydrate (litharge or lead carbonate will not answer), and digest on a water-bath for a few minutes, until the supernatant fluid is colourless. Then transfer to a porcelain capsule, rinse the flask with hot alcohol, mix with clean white sand, evaporate the mixture to dryness, and place the whole in the extraction tube. Finally treat with chloroform for three or four hours, and determine the caffeine volumetrically as previously directed.

Assay of Kola. P. Carles. (*Annales de Chim. Analyt.*, i. 345. From *Pharm. Journ.*) Ten grammes of the very finely powdered drug are mixed intimately with 1 gramme of slaked lime and 20 grammes of alcohol (80 per cent. by volume). The mixture is dried on the water-bath with occasional agitation until the mass weighs 14 grammes; it is then rubbed down in a mortar and introduced into a small flask fitted with a long glass tube condenser and mixed with 35 c.c. of a menstruum composed of 100 grammes of chloroform and 20 grammes of alcohol (93 to 94 per cent. by volume). This mixture is digested on a water-bath for one hour, filtered, the residue extracted in a similar manner three times more with 35, 30, and 25 c.c. of the menstruum respectively. The united filtrates are evaporated to dryness, and the residue is treated with 10 c.c. of boiling water acidulated with 4 or 5 drops of 1 per cent. sulphuric acid, then with 6 c.c. of boiling water, and lastly with 5 c.c. These aqueous extracts are mixed, evaporated to dryness, and weighed. The weight multiplied by ten gives the percentage of theobromine and caffeine in the nuts.

When it is simply needed to determine the "kolanine" or the combination of alkaloids with kola-tannic acid, the powder is first exhausted with cold water, which removes the free caffeine, and then extracted with alcohol (70 per cent. by volume), which dissolves the kolanine. This alcoholic solution is evaporated to an extract, treated with cold water, which leaves the crude kolanine undissolved, and the latter then dried and weighed. To determine the richness of this kolanine in alkaloids, 1 gramme of it is triturated with a gramme of slaked lime and a few grammes of alcohol (70 per cent. by volume); 3 grammes of chalk are added, and the whole is dried until it weighs 6 grammes. This residue is then treated with chloroform-alcohol mixture as described above for the nuts.

Ochoco Nut. O. Warburg. (*Pharm. Journ.*, 4th series, iii. 380.) Some years ago the seed from the Gaboon known as "ochoco" was identified by J. Moeller as a species of *Dryobalanops* (Dingl., *Polytechn. Journ.*, 1880, p. 432). The author, who has recently had an opportunity of examining a similar seed from the Cameroons, but which was contained in the pericarp, has been enabled to identify the latter as the seed of a new myristicaceous plant belonging to the genus *Scyphocephalum*, and has named it *S. chrysothrix*. He has reason to think that the ochoco of the Gaboon is yielded by the nearly-allied species, *S. kombo*, which differs from the leaf in having a cordate base. Another oil seed from the Cameroons is identified by him as the produce of a new species of *Cælocaryon*, viz., *C. preussii* (Myristicacæ). The name "kombo" is, he thinks, more correctly applied to the produce of *Pycnanthus microcephalus* and *P. angolensis*, the former from St. Thomé, and the latter from the Gaboon. Ochoco seed is stated to contain 61 per cent. of a fat melting at 70°, and kombo seed 72 per cent.

Constituents of Anagyris Fœtida. A. Partheil and L. Spasski. (*Chem. Centr.*, 1896, 375.) The seeds of *Anagyris fœtida* contain two alkaloids, cytisine and anagyryne. Commercial "anagyryne hydrobromide" appears to be a mixture. An aqueous solution of pure anagyryne is lævorotatory, and the aurochloride of this base melts at 206–207° C.

Poisonous Properties of Lathyrus Sativus. R. S. McDougall. (*Trans. Bot. Soc., Edinb.*, xx. 301. From *Pharm. Journ.*) The author has collected a number of facts with regard to the poisonous properties of the seeds of *Lathyrus sativus* and of some other leguminous plants. He states that the continual use of pulse by

man as a daily article of food leads eventually to paralysis of the lower limbs, various instances of this being recorded in Scotland and in India. During the seventeenth and eighteenth centuries pulse was forbidden as an article of food in Germany and in France. On horses it has also an injurious effect, causing roaring, the only effectual cure being tracheotomy. On swine it produces paralysis and spasm. The alleged instances of the poisonous effects of *Cicer arietinum*, the chick-pea, are probably due to *Lathyrus sativus* having been mistaken for it. The poisonous alkaloid of the seeds of *Lathyrus sativus* does not appear at present to have been separated.

Constituents of the Fruit of Myroxylon Pereiræ. H. Germann. (*Archiv der Pharm.*, ccxxxiv. 641-647.) The seeds of *Myroxylon Pereiræ* often exhibit on their surface well-developed crystals of coumarin, which apparently does not occur in the interior of the seed. The fats which are present consist of palmitin, stearin, and olein. The finely powdered shells of the seeds were extracted first with hot alcohol, and then with ether; the hot alcoholic solution, on cooling, yielded *myroxocercin*, $C_{12}H_{20}O$, a reddish powder of indifferent nature. The alcoholic solution, on distillation, left a residue from which boiling water extracted a tannin and glucose. Part of the residue insoluble in water dissolved in 1 per cent. potash solution, but was precipitated again on the addition of concentrated potash. After several recrystallisations from alcohol, a pure compound *myroxofluorin*, $C_{42}H_{64}O_{10}$, was obtained.

Myroxol, $C_{46}H_{68}O_{10}$, a substance of alcoholic nature, and *myroxoresen*, $(C_7H_{10}O)_n$, were also isolated; the latter is not decomposed by fusion with potash, and after prolonged treatment with concentrated nitric acid yields picric acid.

The ethereal extract yielded *myroxin*, $C_{23}H_{36}O$.

Constituents of Black and White Mustard Seeds. J. Gadamer. (*Journ. de Pharm.*, 1896, 462-468.) Potassium myronate (sinigrin) crystallises with $1H_2O$, which it loses at 100° in a vacuum, it then having the composition $C_{10}H_{16}NS_2O_9K$; it undergoes slight decomposition during the drying, and melts at $126-127^\circ$. Its solutions are lævogyrate $[\alpha]_D = -15^\circ 13'$. In the decomposition of the glucoside by means of myrosin, water plays a part; a portion of the ferment becomes coagulated by the potassium hydrogen sulphate formed, and is thus rendered useless; but if the acid sulphate is kept neutralised by potash, the decomposition is more complete, although the yield is always some 2 per cent.

below the theoretical. An excess of alkali, however, retards the fermentation. Some of the secondary products formed are allyl sulphide and cyanide and carbon bisulphide.

Air-dried sinalbin, the glucoside of white mustard, has the composition $C_{30}H_{42}N_2S_2O_{15} + 5H_2O$; it readily loses $4H_2O$ when kept over sulphuric acid, but only gives up the last molecule when kept over sulphuric acid for six weeks. The air-dried compound melts at $83-84^\circ$, and the anhydrous compound at $138.5-140^\circ$. It is lævogyrate, the rotatory power of the anhydrous compound being $[\alpha]_D = -8^\circ 30'$. Under the influence of myrosin, it combines with water, and then yields an essential oil, $C_7H_7O.NCS$, sinapin hydrogen sulphate, $C_{16}H_{24}NO_5.HSO_4$, and *d*-glucose. On distillation with steam, it yields thiocyanic acid and sulphur. The author contradicts König's statement that white mustard contains sinigrin.

Sinapin, according to Babo and Hirschbrunn, exists in white mustard in two modifications, one of which turns red with ferric salts, whilst the other does not. The author thinks, however, that the latter modification is identical with sinalbin, whereas the former is produced by the decomposition of sinalbin in the course of its preparation by Babo and Hirschbrunn's method. Sinapin exists in black mustard in the form of its *hydrogen sulphate*, which crystallises from water on the addition of sulphuric acid. Its composition is $C_{16}H_{24}NO_5.HSO_4 + 2H_2O$, and it melts at $186-188^\circ$. It has not been found possible to isolate the base, as it readily dissolves in water and undergoes decomposition.

Pharmaceutical and Chemical Characteristics of Cubebs and the Piperaceous Fruits used for their Adulteration. K. Peinemann. (*Archiv der Pharm.*, ccxxxiv. 204-271. From *Journ. Chem. Soc.*) The various piperaceous and other fruits used for adulterating cubebs may be, for the most part, distinguished from true cubebs simply by their external characteristics, whilst others resemble the genuine drug so closely that a microscopic examination of a section of the fruit is necessary. A few of the adulterants, however, can only be distinguished by the fact that they do not contain cubebin, and therefore do not give a purple-red coloration with strong sulphuric acid. Cubebin does not occur in the perisperm only, as has hitherto been supposed, but also in the pericarp, and the same is true of the occurrence of piperine in black pepper. Piperaceous plants which contain cubebin or an allied compound do not, as a rule, contain any alkaloid, such as piperine; but one plant has been found which is an exception to this. *Piper Lowong*,

Bl., is found to contain 1·5 per cent. of piperine and 0·71 per cent. of a substance which closely resembles cubebin, but is isomeric with it, and is therefore termed *pseudocubebin*, $C_{20}H_{20}O_6$. This compound crystallises in long needles, melts at 122° , and in chloroform solution is dextrorotatory, whilst cubebin melts at 125° , and is levorotatory. Pseudocubebin, moreover, has no taste, and gives a yellowish-brown coloration with sulphuric acid, whilst cubebin has a penetrating bitter taste, and is coloured a reddish-purple by sulphuric acid. The molecular formula was determined by the boiling point method in benzol solution. By oxidation with potassium permanganate, pseudocubebin is converted into piperonylic acid, in the same way as cubebin; but when fused with potash, it yields no solid product which could be isolated, whilst cubebin is thereby converted into protocatechuic and acetic acids. Bromine converts pseudocubebin into the *dibromo-compound*, which crystallises in silky needles melting at 177° . *Dinitropseudocubebin* crystallises in small, yellow needles, almost insoluble in acetic acid. The corresponding *dinitrocubebin* also forms small needles, melts at $182\cdot5^\circ$, and dissolves moderately freely in acetic acid. Pseudocubebin is not attacked by benzoic chloride or sodium ethoxide, and is converted into a brown resin by hydrochloric acid at 100° . Alcoholic hydrogen chloride, on the other hand, converts it into a white, amorphous powder, which could not be obtained pure.

The ethereal oil present in *Piper Lowong*, Bl., may be divided by fractionation into two parts; that which boils at the higher temperature contains a crystalline substance which melts at 164° , and has the composition $C_{10}H_{20}O_2$.

The substance described as cubebin by various authors does not always appear to be the same compound. The molecular weight of some specimens corresponds with the formula $C_{20}H_{20}O_6$, whilst the molecular formula of others is $C_{40}H_{40}O_{12}$. The melting point, solubility, and even the colour reactions also vary, as do the products obtained by bromination and nitration.

A Dangerous Adulteration of Aniseed. (*Pharm. Journ.*, 4th series, iv. 399.) Attention is called to a statement emanating from Berlin that several bales of aniseed received at Rotterdam were found on examination to be contaminated with 10 per cent. of hemlock fruits. The subsequent whereabouts of these bales could not be ascertained.

Commercial Varieties of Fennel and their Essential Oils. J. C. Umney. (*Pharm. Journ.*, 4th series, iv. 225-227; also *Chemist*

and *Druggist*, 1897, 417, 418.) The results of the author's investigation lead to the conclusion that the Russian, Roumanian, Galician, Japanese, and Saxon varieties of fennel are best adapted for pharmaceutical use, with a preference for the last named. In these fennels the percentage of oil is greatest, the flavour more decidedly agreeable, and the fenchone present is probably not without marked carminative properties. All these fruits answer the description of fennel as given in the British and United States Pharmacopœias.

The original paper should be consulted for fuller particulars.

Linseed Meal. F. W. A. Woll. (*Ann. Rep. Agr. Exp. Stat. Wisconsin*, xii. 64-85. From *Amer. Journ. Pharm.*) Linseed cake prepared by the old method, in which the moistened seeds were heated to about 70-80° and pressed, contained 6-7 per cent. of fat. In the new method, the crushed and heated seeds are extracted about 12 times with light petroleum, and the seeds, after being steamed to remove the light petroleum, are dried and ground. The meal so obtained contains fat (3.2 per cent.) and proteïds (37.9 per cent.), whilst by the old method it contained 7.2 and 35.9 per cent. of fat and proteïds respectively. The proteïds are abnormally high owing to the climatic conditions of the year. The lower digestibility of the residues extracted with light petroleum is attributed to the steaming.

The two kinds of meal can be distinguished by means of the "swelling test" in the following manner. The meal (5 grammes) is mixed with boiling water (50 c.c.) in a graduated cylinder and left for 2 hours, and the amount of clear liquid read off. Whilst meals prepared by the old process absorb the whole of the water added, those obtained after extraction with light petroleum only absorbed from 4.1 to 6.3 parts.

Linseed as a Remedy in Diabetes. W. W. Vogel. (*Zeitschr. des. oesterr. Apoth. Ver.*, xxxv. 180, from *Pharm. Zeitung*.) The author reports that linseed tea, prepared by prolonged boiling of a tablespoonful of the seed with about 800 or 900 c.c. of water and subsequent straining, proves a very promising remedy for diabetes. 200 c.c. of the warm tea are taken in the morning before or after breakfast, the same quantity at noon before or after dinner, and a similar dose at bedtime. The usual conditions of diet requisite for diabetic patients must be observed. The author has tried this remedy in upwards of 100 cases with excellent results.

Therapeutic Properties of Bilberries. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 894.) Bilberry fruit is recommended in the form of an extract as an application for burns. Its beneficial effects are stated to be very remarkable, and are attributed to the astringent and antifermentative properties of the fruit. The remedy is entirely free from irritating or injurious effects.

Therapeutic Properties of Horse-Chestnuts (*Aesculus Hippocastanum*). M. Artault. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 94.) Compare abstract, *Year-Book of Pharmacy*, 1896, 134. The author supplies further confirmatory evidence respecting the value of horse-chestnuts for the relief of pain in hæmorrhoids. He employs a mixture of 30 grammes of the extract with 5 drops of chloroform, given in doses of 10-15 drops in a little wine night and morning. If there be hæmorrhage, he prefers a mixture of 20 grammes of the extract with 10 grammes of extr. hamamelidis fluid. and 2 drops of ol. menth. pip., which is administered in the same way.

Tonka Beans. J. H. Hart. (*Amer. Journ. Pharm.*, March, 1897, 157, 158.) The tonka, tonga, or tonquin bean is the produce of *Dipterix odorata* (*Coumarouna odora*). The tree thrives well in Trinidad when planted in shady, damp situations, and is very abundant in the forest of the neighbouring mainland of Venezuela. The tree grows sixty feet or more in height. It belongs to the *Leguminosæ*, but is one of the few members of this order that produces a single-seeded drupe-like pod, which does not open at maturity. The seed, when ripe, so soon loses its vitality that it is difficult at times to procure supplies for raising plants.

The fruit or seed ripens in June and July, and in these months large shipments are received in Trinidad from South American ports. The beans are sent to Trinidad for preparation for European and American markets; for this purpose they are conveyed to warehouses, where, under customs regulations, they are steeped in rum for a certain time, and are then spread on the floors in layers 9 to 12 inches in thickness, to undergo a kind of fermenting and decaying process, during which white crystals are developed on the outside of the bean. As much as £30,000 worth have been imported and re-shipped during a single year.

Constituents of Ungueko. A. Hébert. (*Comptes Rendus*, cxxii. 1550-1553.) The drug reported upon by the author consists of the seeds of a large tree, which are obtained from I'Sana in Loango, and are known to the natives as *ungueko*. These seeds

yield a thick, reddish, fatty oil, containing, in addition to oleic and linoleic acids, a new solid fatty acid of the composition $C_{14}H_{20}O_2$, for which the author proposes the name *isanic acid*. The latter forms large flaky crystals, which are optically inactive, have a peculiar odour and are soluble in alkalies and in most organic solvents. On exposure to air, this constituent rapidly undergoes oxidation, and yields a stable, rose-coloured product insoluble in ether.

Fermentative Changes in Olives and in Olive Oil. G. Tolomei. (*Ber. der deutsch. chem. Ges.*, 1896, No. 12, 596, 597.) The pulpy portion of olives is shown by the author to contain an enzyme, named by him "*olease*," which in the presence of oxygen causes the so-called fermentation of these fruits. This action requires a temperature of upwards of $35^{\circ}C$. for its energetic development; if, therefore, the olives are only exposed in thin layers to the air, the fermentation is but slight, owing to the rapid loss of the heat evolved. But if the olives be exposed in large heaps, the heat is kept confined and the decomposition proceeds rapidly. In this action of the olease on the olives, carbonic, acetic, oleic, sebacic and other acids are liberated, and the fermentation ceases as soon as a certain amount of acidity has been thus produced.

Oleaze also passes into olive oil, causing in this a liberation of fatty acids accompanied by the deposition of colouring matters and a gradual bleaching of the oil. This action of oleaze is greatly accelerated by light, so that olive oil, when exposed to strong light, ages as much in a very short time as it would otherwise do in years. But if the oil is freed from oleaze by repeated agitation with water, the oil will retain its colour even after prolonged exposure to light.

The Fatty Oils of Ergot and of the Seeds of *Strophanthus Hispidus* and *Hyoscyamus Niger*. J. A. Mjöen. (*Archiv der Pharm.*, cccxxiv. 278, 283, and 286.) The author has obtained the following analytical results with these oils:—

	Oil of <i>Secale cornutum</i> .	Oil of <i>Strophanthus hispidus</i> .	Oil of <i>Hyoscyamus niger</i> .
Specific gravity at 15°	0.9254	0.9285	0.939
Saponification number	178.4	187.9	170.4
Iodine number	71.08	73.02	138.0
Acetyl number	62.9	0.0	0.0
Melting point of fatty acids . .	$39.5-42^{\circ}$	$28-30^{\circ}$	—

The oil of ergot contains cholesterin and the glycerides of palmitic and oleic acids, together with that of a hydroxy-acid which has not been isolated. The two other oils consist mainly of the glycerides of oleic and palmitic acids, that of *Hyoscyamus niger* also containing the glyceride of another unsaturated acid.

Swedish Ergot. H. Beckurts. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 3.) The author has estimated the percentages of cornutine and of fat in two samples of Swedish ergot collected in 1895 and 1896 respectively. Duplicate determinations were made in each case with the following results:—

	Cornutine.	Fat.
	Per cent.	Per cent.
Swedish ergot collected in 1895 . . .	{ 0·0373 0·038	25·2 25·52
Swedish ergot collected in 1896 . . .	{ 0·0466 0·046	27·32 27·68

These results, together with those previously obtained by Mjöen in the examination of specimens of the Norwegian drug, indicate that the amount of cornutine in both Swedish and Norwegian ergot appears to be very small.

Basic Constituents of Ergot. C. C. Keller. (*Schweiz. Wochenschr. für Chem. und Pharm.*, xxxiv. 65.) The author arrives at the conclusion that ergot contains only one single base, Kobert's cornutine, Tanret's ergotinine, and the picrosclerotine of Dragendorff and Podwyssotski all being identical or somewhat altered forms of the same substance. The sphacelotoxin or spasmotin of Jacoby is considered by him to owe its activity to the presence of cornutine.

Amanita Muscaria (*Agaricus Muscarius*). A. B. Griffiths. (*Comptes Rendus*, cxxii. 1342.) The author has isolated the red colouring constituent of this fungus, and finds it to have a composition corresponding to the formula $C_{19}H_{18}O_6$. It is insoluble in water, but soluble in ether or chloroform.

Composition of the Sap of the Upas Tree, Antiaris Toxicaria. H. Kiliani. (*Archiv der Pharm.*, ccxxxiv. 438–451.) This sap, which is used as an arrow poison, yields to ether *antiarol*, $OH.C_6H_2(OMe)_3$, and *antiar-resin*, $C_{24}H_{36}O$, both of which are crystallisable. Alcohol extracts the poisonous glucoside *antiarin*, $C_{27}H_{42}O_{10} + 4H_2O$, which crystallises in rhombic hexagonal plates

melting at 225°C . On decomposition by hydrolysis this glucoside yields *antiarigenin*, $\text{C}_{21}\text{H}_{30}\text{O}_5$, and *antiarose*, $\text{C}_6\text{H}_{12}\text{O}_5$, the latter of which is isomeric with rhamnose. The sap also contains a large amount of potassium nitrate.

Jeypore Opium. W. R. Dunstan. (*Journ. Imp. Inst.*, November, 1896; *Chemist and Druggist*, November 14th, 1896.) The author reports on some specimens of opium from Jeypore, which were tested in the Research Laboratory of the Imperial Institute by H. Brown. For the estimation of morphine the method of Flückiger, supplemented by titration of the alkaloidal residue, was used. If the B.P. process had been followed, the percentages of morphine would have been represented nearly 1 per cent. higher than those given in the following table:—

Specimen labelled.	Morphine.	Narcotine.
	Per cent.	Per cent.
White	5	4.5
Soosni	5.7	5.6
Gulabi	4.6	6.5
White and pink	7.2	7.1
Red	7.75	7.1

According to the B.P., medicinal opium should not contain much less than 10 per cent. of morphine. None of the Jeypore specimens reaches this standard, even allowing for the higher results which would have been obtained with the official process. The deficiency in morphine, and the richness in narcotine, of Jeypore opium may be due to the employment of varieties of poppy differing from those which yield the Turkey opium, or to an unsatisfactory process of collection causing a loss of morphine. But these features may considerably detract from its value for medicinal use and likewise for the manufacture of morphine.

A New Process for the Assay of Opium. G. Loeff. (*Journ. de Pharm.* [6], iv. 312.) The author finds that sodium salicylate readily precipitates the resinous matter contained in opium extract, and also a part of the narcotine. The morphine can then be precipitated from the clear filtrate by means of ammonia and a little ether. After stirring for about ten minutes, a white precipitate is obtained, which is dried, then freed from narcotine by washing with benzol, and weighed.

Assay of Opium and its Preparations. A. Grandval and H. Lajoux. (*Journ. de Pharm. et de Chim.* [6], v. 153; *Amer. Journ.*

Pharm., April, 1897.) The authors recommend the following process as easy and rapid of execution and yielding a pure white morphine.

Opium is estimated by taking 10 grammes, triturating in a glass mortar with 40 grammes of distilled water, until the drug is finely divided, throwing on a folded filter and washing the mortar with 40 grammes of water, which are also poured on the filter. The mass is allowed to drain well, the filter and its contents are then returned to the mortar and triturated with 40 grammes of water added in several portions. The whole is then poured on a plain filter and washed with water until the washings are free from colour and taste. The filtered liquid and washings are evaporated on a water-bath to 13 grammes; to this residue are added 13 grammes of 95 per cent. alcohol, and the mixture is allowed to stand half an hour for the sulphate and meconate of calcium to deposit; it is then filtered through a small filter moistened with 60 per cent. alcohol, and the filter and precipitate are washed with alcohol applied drop by drop, so that not more than 10 grammes of alcohol are used when the washing is complete. The edges of the filter are kept from drying during the washing by covering the funnel with a watch-glass. Ammonia is next added, drop by drop, to the liquid until the odour is just perceptible, and the whole is agitated for some minutes, then set aside for twelve hours in a cool place. The precipitate of morphine and narcotine is collected on a plain filter, previously dried at 100°, tared and moistened with alcohol of 60 per cent. When the liquid has run through, the precipitate is washed with alcohol of 40 per cent. until the filtrate runs colourless, when not more than 25 c.c. should have been used. The filter and its contents are then dried at 100°, weighed and returned to the funnel, where 5 c.c. of ether are added, followed by 10 grammes of chloroform, which dissolves the narcotine. Finally the morphine and filter are dried at 100° and weighed. The morphine, being in the state of hydrate and crystalline, is not dissolved by the chloroform, which only dissolves morphine when in the state of anhydride.

Extract of opium is assayed by dissolving 5 grammes of the extract in 5 grammes of water, adding 5 grammes of alcohol of 95 per cent., allowing to stand, and then transferring to a plain filter moistened with 60 per cent. alcohol. The precipitate is washed with alcohol of 40 per cent., of which about 10 c.c. are required; the operation is then conducted in the same manner as above.

The liquid preparations of opium are assayed by slight modifications of the process which readily suggest themselves.

Assay of Opium and its Preparations. E. H. Farr and R. Wright. (*Pharm. Journ.*, 4th series, iv. 202, 203.) Though the present official process for the assay of opium has met with much adverse criticism, the authors arrive at the conclusion that for general pharmaceutical use no better process has yet been published. Certain precautions, however, are necessary in order to obtain the best results. The opium should be reduced to a very fine powder, as otherwise a loss of morphine may occur amounting sometimes to as much as 5 per cent. of the alkaloid present. With regard to the final desiccation of the morphine yielded by the process, the authors agree with Dott that a temperature of 110°C . is preferable to 100°C . as being more certain to render the alkaloid perfectly anhydrous. It should also be remembered that the dried morphine invariably contains some impurity, and will therefore never neutralise the theoretical amount of standard acid. The loss of morphine in the mother-liquor and ether from which it has been precipitated is found to amount on an average to 0.1 gramme for every 100 c.c. of filtrate operated upon. With the elimination of the sources of error alluded to, the official process proves to yield results very closely agreeing with those afforded by the best of other published methods.

Extract of opium may be assayed in the same manner as the drug itself, but the quantity operated upon should be only half that given for opium, the proportion of the other ingredients remaining the same.

With regard to tincture of opium, the authors state that the directions suggested by them some years ago yield results which are slightly too high. They now propose the following modification, which they find to be thoroughly trustworthy and to be equally applicable to the assay of the liquid extract of opium:—Take 80 c.c. of the tincture and evaporate by a gentle heat until the volume is reduced to about 20 c.c.; mix this thoroughly in a mortar with 3 grammes of freshly-slaked lime, and dilute with water to 85 c.c., stirring occasionally during half an hour; then filter 50 c.c. into a 4-oz. bottle having a wide mouth fitted with an accurately-ground stopper; add 2 grammes of ammonium chloride, 30 c.c. of ether and 5 c.c. of alcohol; shake well at intervals during half an hour, then set aside for twelve hours. Next remove the ethereal layer by means of a pipette, rotate the contents of the bottle with a further 15 c.c. of ether, and when

the latter has completely separated, remove it as before by means of a pipette and filter through counterpoised filter papers placed one in the other. Wash the filter with a little ether, and then let the residual ether evaporate from the paper. Next collect the whole of the crystals on the inner paper, rinsing the last portions out of the bottle and washing the crystals with morphinated water until the washings are colourless. Dry the crystals, at first by pressure between folds of filtering paper, then at a gentle heat, and finally at 110° C. for an hour, then weigh.

Take .3 gramme of the crystals and dissolve in a slight excess of $\frac{N}{10}$ sulphuric acid and titrate back with $\frac{N}{10}$ soda solution, using litmus paper to indicate the end reaction.

To the amount of pure anhydrous morphine in the total amount of the crystals, as indicated by the titration, add .05 gramme, representing the average amount of morphine lost in the process. The combined weights multiplied by two will be the percentage of morphine in the liquid.

The following table shows the relative results by the method just given in comparison with those afforded by Dott's and by Teschemacher and Smith's processes on five different samples of tincture of opium :—

Process followed.	Percentage of morphine found in the samples.				
	A	B	C	D	E
Modified B.P. Process	1.06	1.03	1.16	1.02	1.05
Teschemacher and Smith's	1.04	1.02	1.08	1.00	1.03
Dott's	1.01	1.01	1.09	1.01	1.06

Presence of Starch and Strontium Sulphate in Opium. L. F. Kebler and C. H. La Wall. (*Amer. Journ. Pharm.*, 1897, 244-250.) The authors confirm the not infrequent presence of starch in opium, and describe the manner of its detection and estimation, particulars of which will be found in their paper. They do not think that starch, any more than epidermal tissue, rumex seed, or the calcareous salts found in Turkey opium can be properly called an adulterant, as it is generally acknowledged that commercial opium is the concrete juice of the poppy mixed with various other substances.

The authors also call attention to the occasional occurrence of strontium sulphate in opium, and to the disturbing effect it has on the assay of the drug. This substance they are inclined to regard

in the light of an adulterant. H. Trimble, however, in alluding to this observation (*Amer. Journ. Pharm.*, 1897, 296, 297), thinks it quite possible that this impurity may be a natural constituent of opium, since strontium has already been detected by him and others in the ash of various plants.

Assay of Aloes. T. Schäfer. (*Pharm. Zeitschr. für Russl.*, xxxvi. 65.) Fifty grammes of aloes are dissolved in 300 c.c. of hot water acidulated with a few drops of hydrochloric acid. The solution is allowed to stand, then decanted from the deposited resin, mixed with 50 c.c. of a 20 per cent. solution of ammonia and subsequently with a solution of 15 grammes of calcium chloride in 30 c.c. of water. The mixture is now well stirred, then allowed to stand for a quarter of an hour, and the aloin-calcium compound thus precipitated collected and drained. The latter is now mixed with a slight excess of hydrochloric acid, the resulting mixture of aloin and calcium chloride dissolved in a very small quantity of boiling water, filtered, and the filtrate allowed to crystallise at a very low temperature. The pure aloin thus obtained from commercial aloes varies between 15 and 30 per cent. according to the quality of the drug.

Recognition of Aloes in Medicinal Combinations. P. Apéry. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 766, 767.) The author first discusses the test described by Bornträger, Cripps and Dymond, Klunge, and Kremel, and then suggests the reaction of aloes with ferric chloride as the best means for the detection of this drug. The preparation to be tested is extracted with alcohol, the filtered alcoholic solution evaporated to dryness, the residue dissolved in warm water, the filtered aqueous solution precipitated with lead acetate, again filtered, the filtrate concentrated by evaporation on the water-bath, the excess of lead then removed by means of sodium carbonate, and the filtered liquid carefully neutralised with dilute nitric acid. The addition to the resulting liquid of a few drops of dilute ferric chloride solution will indicate the presence of aloes by the production of a reddish-brown coloration, which is still discernible even if the proportion of the drug in the liquid amounts to no more than 1 in 2,000. Brouardel has shown that kola, areca, pambotano, and similar drugs also produce an analogous reaction with ferric chloride; but these are rarely present along with aloes in the same mixture.

A New Kino from Species of Myristica. E. Schaer. (*Pharm. Journ.*, 4th series, iii. 117, 118.) The dried juices of the bark of several Asiatic species of *Myristica*, such as *M. malabarica* and *M.*

fragrans, show but little difference in appearance, physical characters and chemical reactions from the officinal Malabar kino (*Pterocarpus marsupium*). *Myristica* kino, however, differs from *Pterocarpus* kino and others by containing, in the crude state of the inspissated fresh juice, smaller or larger amounts of crystalline calcium tartrate, suspended in, and depositing from, the liquid juice. By this characteristic admixture it can be easily distinguished from the official kino and probably also from other kinos of commerce.

Johore Gambier. W. O. Richtmann. (*Pharm. Rev.*, xv. 27, and *Amer. Journ. Pharm.*, 1897.) The author has examined six specimens of Johore gambier obtained by the University of Wisconsin from the Columbian Exhibition. The tannin was estimated by the process recommended by the Commission of German Technical Chemists and published in 1885; the catechin was determined by extracting it from the aqueous solution of the gambier, and the ash and moisture according to the usual methods. The following results expressed in percentages were obtained:—

Specimen No.	Moisture.	Ash.	Tannin.	Catechin.
2900	12.37	4.35	39.63	11.10
2901	11.20	3.63	32.51	9.22
2902	1.38	3.65	40.51	9.39
2904	1.50	1.87	46.95	5.25
2905	8.37	3.77	22.21	8.68
2906	7.00	4.13	29.94	6.98

The presence of two fungi, *Penicillium glaucum* and *Aspergillus niger*, was observed.

Notes on the Trees yielding Myrrh and Gum Arabic. E. M. Holmes. (*Pharm. Journ.*, 4th series, iii. 507-509; also *Chemist and Druggist*, 1896, 847.) Myrrh is imported into this country chiefly from Aden, to which port it is sent from Arabia and Abyssinia. Some comes from Bombay, and is known in the London market as "red Zanzibar myrrh." Writers on materia medica distinguish chiefly four varieties of myrrh; viz., Somali myrrh; Arabian myrrh of Hanbury; Arabian myrrh of Dymock, or "Meetiya"; and Yemen myrrh. Less known kinds are Persian, Chinese, and Siam myrrhs, which occur in the Bombay market. Judging from the taste and odour of the four principal varieties referred to, these may all be supposed to be the produce of one

species of *Commiphora*, or of varieties of the same species modified by conditions of soil, elevation and climate. Concerning the plant yielding Somali myrrh there is no exact information, as there exists very little evidence connecting the gum resin with the trees supposed to yield it, owing partly to the fact that collectors of plants are not usually well acquainted with the drugs of commerce. With regard to Arabian myrrh the case is different. The specimens collected in S. Arabia by Ehrenberg in 1822 were referred to *Balsamodendron myrrha*, Nees. Subsequently, however, Berg showed that two species were mixed under this name, and he separated the second, which has obcordate leaflets, under the name of *B. Ehrenbergianum*. The first of these, *Balsamodendron*, or as it is now called *Commiphora myrrha*, has recently been stated by Schweinfurth to yield no resin at all, and the second has been identified as a variety of the Balm of Gilead tree, *C. opobalsamum*. According to this author, Arabian myrrh is the produce of *Commiphora abyssinica*, Engl., and of *C. schimperi*; while the Director of Kew Gardens expresses the opinion that *C. simplicifolia* may be accepted as the source of Yemen myrrh, and that Fadhli myrrh may be yielded by both *C. myrrha* and *C. simplicifolia*.

Specimens of *Commiphora abyssinica*, *C. schimperi*, *C. simplicifolia*, *C. africana*, and *C. opobalsamum* having recently been presented by Prof. Schweinfurth to the Pharmaceutical Society's herbarium, the author of the present paper has examined the bark and fruits of these specimens with regard to their taste, as the very bitter taste and peculiar aroma of true myrrh is hardly likely to be entirely absent in the plant itself. He was unable, however, to detect the odour and taste of myrrh in any one of these, and considers himself driven to the conclusion that Arabian myrrh is the produce of *Commiphora myrrha*, the plant named *Balsamodendron myrrha* by Nees.

There are several acrid gum resins which occur mixed with myrrh as imported. The most abundant of these is opaque bdellium, which, as pointed out by R. H. Parker, differs from hotai in its greater toughness, and in giving an intense greenish-black colour with ferric chloride.

Gum Arabic.—Specimens of *Acacia senegal*, *A. séyal*, *A. séyal* var. *multijuga*, and *A. fistula* have been presented by Prof. Schweinfurth to the Pharmaceutical Society's herbarium. The author (E. M. Holmes) directs attention to these specimens, and points out that, as the quality of gum brought into the market varies exceedingly in its solubility, the viscosity of its mucilage and

its colour, it would be worth while to try and cultivate the best kind, viz., *Acacia senegal*, in Australia, or other suitable colonies.

Constituents of Asafœtida. J. Polásek. (*Archiv der Pharm.*, 1897 [2], 125-132.) Pure tears of *Asafœtida amygdaloides* proved on analysis to have the following percentage composition:—

Resin soluble in ether (asaresinotannol ferulate) .	61.40
Resin insoluble in ether (free asaresinotannol) .	0.69
Gum	25.10
Volatile oil	6.70
Vanillin	0.06
Free ferulic acid	1.28
Moisture	2.36
Impurities	2.50

100.00

Chemical Identification of Ammoniacum. (*Journ. de Pharm.*, liii. 16, from *Archiv der Pharm.*) A filtered aqueous solution of the gummy constituent of this gum-resin, when mixed with a solution of ferric chloride, assumes a violet-red colour. This reaction is due to the presence of a small quantity of salicylic acid in the drug.

Composition of Gamboge. M. Sassarini. (*Journ. de Pharm.* [6], v. 171. From *Pharm. Journ.*) The author's examination shows the presence of the following constituents in this gum-resin:—A gum analogous to arabin; a volatile oil boiling between 160 and 210° C., containing a terpene and a camphor; isovitinic and acetic acids; a phenolic ester; a resin; methyl alcohol and other high homologues; and a liquid with a fruity odour, boiling at a high temperature, and presenting the characters of an aldehyde or an acetone. The author is of opinion that the phloroglucin reported as present by other investigators has been a decomposition product.

The volatile oil above referred to does not appear to have been noticed in any previous examination of this drug.

Examination of Powdered Gamboge. E. G. Eberhardt. (*Amer. Journ. Pharm.*, July, 1896, 371-374.) As an outcome of his experiments, the author considers it desirable to require that gamboge should yield from 75 to 80 per cent. of its weight to alcohol, and further, that any official test for starch in this drug should be such as to distinguish between mere traces and appreciable quantities of that substance. He arrives at the latter conclusion on account of the invariable presence of about 1 per

cent. of starch or less in even the best commercial samples of powdered gamboge, a quantity too small to be regarded as an adulteration.

Note on a Sample of Scammony. I. W. Thomson. (*Pharm. Journ.*, 4th series, iv. 245; also *Chemist and Druggist*, 1897, 463.) The author reports upon a suspicious-looking sample of scammony, which was supposed to have been obtained from Germany. It consisted of irregular, greenish-black, hard and horny fragments breaking with a resinous fracture, and giving the following results upon examination:—

Soluble in ether	0.4 per cent.
„ „ alcohol	2.0 „ „
„ „ water	42.6 „ „
Starch and a little cellular tissue .	43.0 „ „
Moisture	12.0 „ „

100.0

It yielded 2.12 per cent. of ash, of which 0.93, equal to 43.6 per cent., was soluble in water. The ash contained K, Mg, Ca, Fe, and Si, as carbonate, sulphate, and a trace of chloride.

The water-soluble portion was a gum, apparently gum arabic. The insoluble portion consisted very largely of starch, with a small quantity of cellular tissue.

Chagual Gum. C. Hartwich. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 565-570 and 593-598.) This Chilean drug is obtained from the central and northern provinces, chiefly from Valparaiso and Coquimbo, but is not met with in Valdivia nor in other more southerly parts of the country. It is used as a domestic remedy for diarrhoea, and is credited with toxic properties by the natives of some districts. It is an exudation product from a monocotyledonous plant, and its formation is stated to be caused by the bite of a caterpillar. Its botanical origin is at present unknown, but the statement that it is the produce of *Puya chilensis* is shown by the author to be erroneous. The present paper gives a sketch of the history of this drug, and a description of specimens obtained from Valparaiso, consisting of pieces varying considerably in their appearance and properties. From the author's observations, for particulars of which the original paper should be referred to, there does not seem to be much prospect of this gum becoming a useful article of commerce except perhaps for purely technical purposes.

Wood Gum. S. W. Johnson. (*Journ. Amer. Chem. Soc.*, xviii.

214-222.) Wood gum is abundantly extracted from the wood of deciduous trees by cold, weak (2-10 per cent.) solutions of sodium hydrate, and is thrown down again on neutralisation or on the addition of alcohol. On hydrolysis, it yields xylose. Wheeler and Tollens, etc., gave the formula $C_6H_{10}O_5$ for wood gum. The author shows by means of numerous analyses that wood gum obtained from ground maize cob is really the anhydride of xylose, that is, it is xylan, and has the composition $C_5H_8O_4$. The analysis is an extremely difficult operation, as the compound has such a great avidity for water; the hygroscopic moisture is best determined by heating the substance to $110-112^\circ$ in a vacuum.

The wood gum obtained from the American white or grey birch (*Betula alba*) has the composition $C_4H_6O_3$, and does not yield xylose on hydrolysis. This compound and its products of hydrolysis are being further investigated.

Composition of Guaiacum Resin. O. G. Doebner and E. Lücker. (*Archiv der Pharm.*, cccxiv. 590-610.) The constituents of this resin were separated by mixing its alcoholic solution with an alcoholic solution of potash, filtering to remove the potassium guaiaretate thus precipitated, evaporating the filtrate, dissolving the residue in water, precipitating the guaiaconic and guaiacic acids with hydrochloric acid, and separating them by means of ether, in which only the former is soluble. The results obtained show the following percentage composition:—

Soluble in alcohol.	{	Guaiaretic acid, $C_{20}H_{24}O_4$, m.p. 86° C.	11.15
		Guaiaconic acid, $C_{20}H_{24}O_5$, m.p. 74-76° C.	50.00
		Guaiacic acid (β -resin), not ob- tained in a pure condition.	11.75
Insoluble in alcohol.	{	Residue (containing 9.64 of gum and 2.10 of ash)	24.96
		Loss	2.14

The so-called "guaiacum oil" is obtained by boiling guaiacum resin with solution of sodium carbonate, allowing to cool, filtering, saturating the filtrate with carbon dioxide, again filtering, extracting the oil with ether and allowing the solvent to evaporate. The product is soluble in water, alcohol, and ether. From the alkaline liquid acids precipitate a yellow colouring matter ("guaiacum yellow"), which has the composition $C_{20}H_{20}O_7$, and imparts a blue colour to strong sulphuric acid.

The blue colour which guaiacum resin produces with certain oxidising agents is due to an oxidation product of guaiaconic acid.

Guaiaretic acid proves to be isomeric with a resin obtained synthetically from tiglic aldehyde by treatment with guaiacol and creosol. Another resin, obtained from tiglic aldehyde by condensation with guaiacol and pyrogallol dimethyl ether, is found to be isomeric with guaiaconic acid.

Note on Guaiacum Resin. F. L. Smith. (*Pharm. Journ.*, 4th series, iv. 101, 102.) The author has examined the residue left by commercial guaiacum resin in making the tincture. This residue from 220 grains of the resin weighed 34·5 grains, and left 3·36 per cent. of ash on incineration; it seemed to be chiefly composed of wood and bark.

Detection of Common Resin in Guaiacum Resin and Balsam of Tolu. E. Hirschsohn. (*Pharm. Zeitschr. für Russl.*, xxxiv. 515.) A sample of the suspected balsam of tolu or guaiacum resin is agitated with 4–5 times its bulk of petroleum ether, then filtered, and the filtrate shaken with its own volume of copper acetate solution (1:1000) containing $\frac{1}{10}$ per cent. of this salt. In the presence of common resin the layer of petroleum ether will assume a greenish colour.

Palm Dragon's-Blood. K. Dieterich. (*Archiv der Pharm.*, ccxxxiv. 401–437; *Journ. Chem. Soc.*, 1897, i. 92.) The dragon's-blood examined was a red substance imported in sticks, which form is less adulterated than the others, and was presumably derived from the fruits of *Dæmonorops Draco* (Sumatra); it melted at 70°. If the crude resin is extracted with ether, and alcohol added, *dracoalban* is precipitated. If the ether alcoholic solution is then evaporated to dryness, light petroleum extracts *dracoresen* from the residue, and leaves a mixture of pure resins, of a red colour; this was shown to consist of the *dracoresinotannol* salts of benzoic and benzoylacetic acids. Of the above substances, the crude resin contains in 100 parts: dracoalban, 2·5; dracoresen, 13·58; red resin (mixture of ethereal salts), 56·86. In addition it contains a resin insoluble in ether, 0·33; a black, amorphous phlobaphene (an oxidation or decomposition product of a tannin; soluble in alkalis), 0·03; plant remains, 18·40; ash, 8·30.

Dracoalban, $C_{20}H_{40}O_4$, is a white, amorphous powder, becoming strongly electrified when rubbed; it softens at 192–193°, and blackens and decomposes above 200°. It is chemically rather

inert, but yields a *trinitro*-derivative, which can be reduced to a *triamido*-derivative, and this yields an *acetyl*-derivative; these are all amorphous.

Dracoresen, $C_{26}H_{44}O_2$, is a bright yellow, amorphous resin, melting at 74° ; it is chemically very inert. A possible indication was obtained of menthol among its products of hydrolysis.

The red resin consisted mainly of dracoresinotannol benzoate; the benzoylacetate was relatively small in amount. The *dracoresinotannol*, $C_8H_9O.OH$, obtained from it on hydrolysis, is a bright brown, amorphous powder; it softens at $100-105^\circ$, but then decomposes without melting.

Other products of the hydrolysis of the resin, in addition to dracoresinotannol, are benzoic acid, acetic acid, and acetophenone.

Sandarac Resin. A. Balzer. (*Archiv der Pharm.*, cxxxiv. 289-316.) This resin contains small proportions of a volatile oil and of a yellow bitter principle, but consists chiefly of two acid resins, viz., *sandaracolic acid*, $C_{45}H_{66}O_7$, and *callitrolic acid*, $C_{65}H_{84}O_8$, the former of which amounts to about 85 per cent. of the drug and forms a potassium salt insoluble in strong potash solution, while the latter amounts to about 10 per cent. and forms a soluble potassium salt. Acetic acid and a substance of a camphor-like odour are found among the distillation products obtained from the drug. Both the resin-acids named are crystalline and monobasic.

Acaroid Resins. A. Tschirch and K. Hildebrand. (*Schweiz. Wochenschr. für Chem. und Pharm.*, xxxv. 121, 138.) The authors have examined the yellow resin of *Xanthorrhœa hastilis* and the red resin of *X. australis*. They find the former to contain 4 per cent. of free paracumaric acid, 0.5 per cent. of free cinnamic acid, and also 7 per cent. of the former and 0.6 per cent. of the latter acid in combination with tannol; likewise small quantities of styracin, paraoxybenzaldehyde, and vanillin (?); and finally 80 per cent. of xanthoresinotannol, which, as an ester of the paracumaric acid, forms the chief constituent of this resin. The remainder consists of impurities. The red acaroid resin of *Xanthorrhœa australis* was found to contain 1 per cent. of free paracumaric acid, 2 per cent. of the same acid and a small quantity of benzoic acid in combination with tannol, and 85 per cent. of erythoresinotannol (chiefly present as an ester of the paracumaric acid). The remainder consists of impurities.

Zanzibar Copal. A. Stephan. (Abstract of an Inaugural Dissertation, reprinted from *Pharm. Journ.*, 4th series, iii. 525.)

Copal is a collective name for a number of resins that exhibit great differences in their chemical and physical properties. They may, according to the author, be arranged in the following groups:—

(a) East African, probably derived from *Trachylobium mossambicense* and *Hymenea verrucosa*.

(b) West African, said to be obtained from *Guibourtia copalifera*, or from species of *Copaifera*.

(c) Kauri copal from New Zealand, the botanical origin of which is *Dammara australis*.

(d) Manilla copal obtained from *Vateria indica*.

(e) South American copal derived from *Hymenea coubaril*, *H. stilbocarpa*, *Trachylobium martianum*, and *T. hornemannianum*.

The first three are fossil resins, and are dug up out of the earth, whilst the last two are collected from the plants yielding them.

To the East African copals belong the following three varieties:—

1. Copal from Mozambique.

2. Copal from Madagascar.

3. Copal from Zanzibar.

The purity and hardness of the last variety render it the most valuable, and the principal object of the author's work was to investigate the constituents of this variety; his results relate, therefore, to Zanzibar copal only. This is emphasised because many statements are met with without any mention of the variety of copal to which they refer.

From Bagamoyo, in East Africa, the author received raw (unwashed) copal, pure copal, and specimens of the tree yielding it. The resin is brought down by the natives to Kilboa from districts removed from the coast; the botanical specimens came from Usegna, which lies inland westward from Bagamoyo. The commercial resin obtained from a German firm, agreed in its characters with the genuine specimens sent from East Africa.

Zanzibar copal, finely powdered, melts at about 140° C.; it is slowly but completely soluble in alcohol; benzol, chloroform, and glacial acetic acid dissolve about 30 per cent., ether about 34 per cent., petroleum spirit and carbon bisulphide about 10 per cent.

When boiled with alcohol, the resin caked, and only a slight proportion dissolved; but by repeated digestion with alcohol it could be brought entirely into solution and precipitated with water. The resin thus purified was more soluble in the menstrua previously mentioned, and dissolved also in boiling very dilute

solution of potash (0·1 per cent.). All attempts to separate it into other constituents were unsuccessful, nor could it be saponified. It appeared to consist of resin-acids, the principal of which, constituting about 80 per cent. of the resin, was called trachyloic acid. This acid could be obtained with difficulty in minute sphæro-crystalline masses melting at 168° C. From it the potassium, copper, and iron salts were prepared. A second acid, present to the extent of about 4 per cent. only, was also obtained; to this the name istrachyloic acid was assigned. These two acids, together with about 6 per cent. of α -copal resin and β -copal resin, a bitter principle and volatile oil, form the constituents of Zanzibar copal as far as the author has been able to ascertain.

An examination of the stems sent from Usegna showed that although the primary cortex contains schizogenous secretion-ducts, these are soon thrown off as the secondary cortex is produced, and in the bark of older twigs and of the stem no ducts could be found. The resin appears, therefore, to be a pathological product.

Dammar Resin. G. Glimmann. (*Archiv der Pharm.*, cccxxiv. 584-589.) This resin is found by the author to have the following composition:—

Dammarolic acid	23·0 per cent.
α -Dammar-resin	40·0 „
β -Dammar-resin	22·5 „
Water	2·5 „
Ash	3·5 „
Volatile oil and bitter principle	0·5 „
Impurities	8·0 „

New Sources of Gutta-Percha. Prof. Engler. (*Notizbl. des K. Bot. Gart. und Mus. Berlin*, 3, 101. From *Pharm. Journ.*) Four new gutta-percha trees are described by the author, which are all natives of King Wilhelm's land, where the following names are applied to the products:—Getah Sussu (*Palagium susu*), which is considered the best kind; Getah Maran (*Payena bawun*); Getah Natu (*Payena mentgelii*), and Getah Nalu (*Sideroxylon kaernbachianum*). It is stated that the milky juice of 1, 3, and 4 is white, whilst the cotyledons of No. 2 turn red on exposure to the air. It may therefore be supposed that the product turns reddish like the Getah Taban Merah of the Malays.

Maturin Copaiba. F. Dietze. (*Pharm. Zeitung*, xlii. 241.) The author states that this balsam, which is rarely met with in

German commerce, corresponds to all official requirements. The sample examined, which had evidently not been filtered, was slightly cloudy, and separated on standing a few drops of water and a small amount of mechanical impurities; it was fairly thick in consistence and had a specific gravity of 0·849. After filtration it had a specific gravity of 0·9832, a fine golden-yellow colour without any fluorescence, and a pleasant aromatic odour. It formed clear solutions with ether, absolute alcohol, amyl alcohol, benzol, chloroform, and fatty oils; with 90 per cent. alcohol it formed a slightly opalescent mixture. On heating to 130° C. it did not gelatinise. The sample contained 59·28 per cent. of resin and 40·72 per cent. of volatile oil, and stood the carbon bisulphide—and the ammonia test—of the D.A.B. III. In comparison with two different specimens of Maracaibo balsam it yielded the following characteristic analytical numbers:—

	Maturin Balsam.	Maracaibo Balsam.	
		<i>a</i>	<i>b</i>
Acid number	78·17	84·0	82·54
Ester „	4·26	6·2	5·77
Saponification number . . .	82·43	90·2	88·31

Tests for the Purity of Copaiba. E. Hirschsohn. (*Pharm. Zeitschr. für Russl.*, xxxiv. 497, 499, and 513.) The presence of fatty oils in copaiba may be detected by boiling 20–40 drops of the sample with 1–2 c.c. of a solution of 1 part of sodium hydrate in 5 parts of 95 per cent. alcohol; the solution should not gelatinise on cooling, nor even on adding twice its volume of ether. The sample should also dissolve completely in 3 vols. of 90 per cent. alcohol, and not deposit any oily drops after being at rest for an hour.

For the detection of gurjun balsam, the sample of copaiba is boiled with 3 vols. of 95 per cent. alcohol and 1 part of crystallised stannous chloride. If the sample is adulterated, it will first turn reddish, and finally blue.

For the purpose of detecting the presence of common resin in copaiba, it has been recommended to triturate the sample with 5 parts of solution of ammonia, and notice whether any gelatinisation takes place. The author, however, finds this test to be untrustworthy.

Adulterated Copaiba. M. Conroy. (*Pharm. Journ.*, 4th series, iv. 219.) Attention is called by the author to the large number

of fictitious samples of copaiba which have recently occurred in the market. But few of the adulterated samples came from copaiba-producing districts, and in these cases the adulterant was generally a fixed oil, easily detected by the want of brittleness or the pasty nature of the residue left on evaporation. Other samples he had examined proved to be entirely fictitious, being made of common resin and oil of turpentine and offered at little more than half the market value of the genuine oleo-resin. These responded to the evaporation test and the tests of the B.P., but their true nature was readily detected by their odour, especially on warming. Other samples, again, were mixtures of the last-named article with varying quantities of true copaiba, and in these the recognition of their composition presented greater difficulties. Gurjun oil did not occur in any of the samples recently examined. While the only adulterants found in the copaiba from South America were fixed oils, the more or less entirely fictitious samples referred to were all obtained from the Continent.

A Spurious Balsam of Tolu. J. O. Braithwaite. (*Pharm. Journ.*, 4th series, iv. 307, 308.) The spurious drug reported upon agreed in some respects with genuine balsam of tolu, but differed markedly in others. It was rather soft and sticky, and assumed a much darker red colour on heating than the true drug does. Boiling water extracted from it 1.15 per cent. of crystalline cinnamic acid against 4.2 per cent. obtained in the same way from the genuine balsam. The portion soluble in carbon bisulphide amounted to 61.4 per cent., and this on evaporation of the solvent was left as a fragrant brown, transparent, viscid mass, showing on saponification with alcoholic potash a total acid number of 278. Real balsam of tolu, similarly treated with carbon bisulphide, yielded a crystalline white residue consisting almost entirely of cinnamic acid and showing a total acid number of not less than 300. The drug could evidently not be regarded as the unmixed or partially exhausted product of *Myroxylon toluifera*. Comparative experiments with storax and with coniferous resins threw no light on the actual nature of the spurious drug.

Essential Oils. Schimmel & Co. (*Schimmel & Co.'s Report*, October, 1896; *Pharm. Journ.*, October, 1896.) This report gives an account of the physical and chemical characters of, and the means of recognising adulteration in, the oils of bergamot, lemon, orange, lavender, and star anise. As the report cannot be condensed without losing much of its value, the reader is referred for particulars to the sources above named.

Reaction of Essential Oils with Stannous Chloride. E. Hirschsohn. (*Chem. Centr.*, 1896, 755.) The volatile oils of gurjun balsam, valerian, musk, and patchouli produce with stannous chloride a red coloration changing to violet and then to blue. The oils of cubebs, pepper, cardamoms, celery seed, galangal, laurel, and sandal wood give a red to pink colour. With the oils of chamomile and wormwood the coloration produced is green to bluish-green.

Odourless Oil of Turpentine. H. Schiff. (*Chem. Zeitung*, xx. 357.) Oil of turpentine in a perfectly pure condition is odourless; the odour of the commercial oil appears to be due to the presence of an aldehyde-like product having the composition of camphoric aldehyde, $C_{10}H_{16}O_3$. This impurity is formed by oxidation of the oil in contact with air, and can be removed from it by shaking with sodium bisulphite. If, after this treatment, the oil is washed with solution of soda, then dried over potash and rectified in a current of carbonic anhydride, an odourless product is obtained which, on exposure to air, soon regains the usual odour. Oil of turpentine which has been kept for some time imperfectly protected against the air generally contains a considerable proportion of the oxidation product referred to.

Victorian Essential Oils. J. C. Umney. (*Pharm. Journ.*, 4th series, iii. 199-201, and 256, 257; also *Chemist and Druggist*, 1896, 257-259.) The oils reported upon by the author are Victorian specimens of the following:—Anise (*Pimpinella anisum*), absinthe, *Boronia polygalifolia*, *Eucalyptus citriodora*, jonquille, millefleurs and tuberose, rose geranium and African geranium, lavender, lemon thyme, myrtle, rose, peppermint, pennyroyal, rosemary, sage, tansy, thyme, and vervain. The original paper should be consulted for particulars.

Assay of Oil of Peppermint. L. F. Kebler. (*Amer. Journ. Pharm.*, 1897, 189-195.)

Estimation of the Combined Menthol.—A weighed quantity (from 10-12 grammes) of the oil is boiled for one hour with 12 c.c. of normal alcoholic sodium hydrate in a flask fitted with an inverted condenser. The excess of alkali is then titrated by means of standard sulphuric acid, using phenolphthalein as indicator. Each c.c. of alkali consumed corresponds to 0.156 gramme of menthol present in a state of ester.

Estimation of the Total Menthol.—A weighed quantity (12-15 grammes) of the oil is boiled for one hour with an equal weight of acetic anhydride and 2 grammes of anhydrous sodium acetate

in a suitable flask fitted with a reflux condenser. After cooling, the mixture is washed in a separating funnel with successive portions of distilled water, using in all about 150 c.c. After vigorous agitation and subsequent rest, the aqueous layer is removed and the mixture again washed with 150 c.c. of water as before. The second wash water being also removed, the contents of the funnel are mixed with 50 c.c. of water, a few drops of phenolphthalein solution, and a quantity of 5 per cent. aqueous sodium hydrate solution just sufficient to render the mixture pinkish. Enough water is now added to augment the aqueous stratum to about 150 c.c., the mixture is shaken, allowed to separate, and the alkaline aqueous solution withdrawn. The oily layer is again washed with 150 c.c. of water as above, the water then completely removed, and the acetylated oil boiled for an hour with 50 or 60 c.c. of normal alcoholic sodium hydrate in a flask fitted with an upright condenser as before. The excess of alkali is then titrated by means of normal sulphuric acid. Each c.c. of the normal alkali consumed corresponds to 0.156 gramme of menthol.

The amount of free menthol is found by deducting from the total menthol the quantity previously determined in the state of ester.

In examining oil of peppermint it is necessary to determine: (1) the specific gravity; (2) the boiling point, varying from a few degrees below 200° C. to about 230° C.; (3) the amount of menthol. The combined menthol varies from 3 to 16 per cent., while the total menthol may vary from 30 to 80 per cent. These data, in connection with the aroma and identity tests, will show the character of any oil of peppermint. The following table gives the results obtained by the foregoing process with commercial menthol and a number of samples of oil of peppermint:—

Source.	Specific Gravity at 15° C.	Per cent. of Menthol as Esters.	Per cent. of Free Menthol.	Per cent. of Total Menthol.
Commercial Menthol	—	None.	99.66	99.66
Western	0.9112	3.72	29.02	32.48
Michigan	0.9065	3.06	28.25	31.33
Michigan	0.9147	4.51	29.92	34.43
New York	0.9143	8.07	44.83	52.90
New York	0.9099	7.31	45.43	52.74
Michigan	0.9099	10.00	40.87	50.87
Unknown	0.8937	8.30	14.94	23.24
Michigan	0.9279	16.06	31.55	47.61
Mixture of Michigan and New York }	0.9079	4.68	38.30	42.98

As compared with normal Japanese oil containing about 75 per cent. of menthol, these results show that oil of peppermint varies considerably. But an oil with a high percentage of total menthol does not always possess the desired fine aroma which is generally proportionate to the amount of menthol esters, unless the presence of the sulphur compound recently discovered by C. Kleber, or some other disturbing condition interferes. The author has reason to regard most of the oils examined as genuine except the one marked unknown, in which an adulteration of turpentine was easily recognised by its boiling point.

Tests for the Purity of Oil of Lemon. A. Soldaini and E. Berté. (*Chemist and Druggist*, 1897, 669.) Oil of lemon may be declared as pure when the optical rotation of the distillate of half its volume is at least 0.30 higher than the residue of the distillation. If it is lower, the presence of more than 2 per cent. of turpentine is indicated. A residue showing a higher rotation than the original oil indicates the presence of oil of orange, or terpene of either lemon or orange, which indications are confirmed by the qualitative reaction as well as by the low percentage of citral (especially in the case of adulteration with terpene), which, co-ordinated with other tests, will tell in the great majority of cases the adulterant used.

The Purity of Sandal-Wood Oil. A. Conrady. (*Pharm. Centralhalle*, 1897, 297.) The author states that this oil should conform to the following requirements:—The oil should be almost colourless or pale yellow, and have a specific gravity of 0.975–0.980, and an optical rotation of -17° to -20° . It should be soluble in five volumes of 70 per cent. alcohol. To glacial acetic acid to which 10 per cent. of hydrochloric acid has been added, it should impart no coloration or at most a pale yellow one within 15 minutes. A mixture of two drops of the oil with 7.5 c.c. of the acid mixture just mentioned and thirty drops of benzaldehyde assumes at once a distinct yellow coloration, which gains in intensity in the course of a few hours, but should not turn green or brownish-green.

The Purity of Sandal-Wood Oil. A. J. Hendrix. (*Journ. de Pharm. et de Chim.* [6], iv. 499.) The author suggests the following mode of examination for this oil:—0.5 gramme of the sample is mixed with a solution of 3 grammes of crystallised phenol in 1 gramme of alcohol, and to this mixture 0.5 gramme of concentrated hydrochloric acid is added without shaking. In the place of pure sandal-wood oil, the zone between the two liquids should

show a yellow coloration, changing to a bright red in a few minutes. In the presence of oil of cedar, the upper layer rapidly becomes mauve coloured, while in the presence of oil of cedar the upper stratum becomes cloudy, and a brown colour is developed in the intermediate zone.

The Characters of Oil of Rose. J. Timney. (*Chemist and Druggist*, 1896, 795.) The author states that the characters of the finest Bulgarian ottos of the past year's production are as follows, and that they may be accepted as standards of excellence:—

Specific gravity at 30° C.	0.856 to 0.860
Stearoptene percentage	16 to 18
Crystallising point	20.4 to 21° C.
Alcoholic percentage (by acetylation process)	71 to 72.5

The following table contains the results of the author's examination of a number of samples:—

—	Sp. Gr. at 30° C.	Crystallising Point.	Approximate Percentage of Stearoptene.	Percentage of Alcohols calculated to $C_{10}H_{18}O$.
No. 1	0.8566	20.9° C.	18	70.1
No. 2	0.8599	20.4° C.	16	72.3
No. 3	0.861	20.0° C.	14	73.1
No. 4	0.859	20.6° C.	16	72.3
No. 5	0.8560	21.7° C.	19.5	69.2
No. 6	0.863	19.4° C.	12.5	75.6
(impure) No. 7	0.868	18.7° C.	10	77.6
(impure) No. 8	0.868	18.9° C.	10	76.6
(impure)				

The adulteration with Turkish geranium oil raises the specific gravity and the proportion of alcoholic bodies present, while it lowers the crystallising point and the percentage of stearoptene.

Standards of Purity of Oil of Rose. E. V. Barrett. (*Chemist and Druggist*, 1896, 902, 903.) The author has examined a number of samples of otto of rose which he had every reason to regard as genuine. His results show the following range of variation in some of the "purity standards" of this oil:—

Specific gravity	0.8550 to 0.8686
Point of crystallisation	17.4° C. to 22.2° C.
Specific rotatory power	—2.878 to —4.081
Angle of rotation	—2° 30' to —3° 30'

The Purity of Oil of Rose. I. Conroy. (*Pharm. Journ.*, 4th series, iii. 473, 474.) The author criticises the tests usually employed for ascertaining the purity of Bulgarian otto of roses, and arrives at the conclusion that the physical tests (specific gravity, freezing point, and optical rotation) do not afford sufficiently trustworthy data for arriving at a satisfactory conclusion. The chemical tests likewise cannot be depended upon. He therefore prefers, on the whole, to rely on the sense of smell, and suggests that one drop of the oil should be dissolved in about 20 drops of rectified spirit, the solution poured into one ounce of warm water at 100° F., and the mixture well shaken. By reducing the otto in this way, the chance of noticing any foreign oil by its odour is increased, especially if compared with the best obtainable standard sample treated in the same way. He states that a well-practised nose may thus readily detect an admixture of 5 per cent. of geranium oil in otto of rose.

French Oil of Rose. J. Dupont and J. Guerlain. (*Comptes Rendus*, cxxiii. 700-702.) The authors give a preliminary account of an examination of two samples of French oil of rose, both of which possessed a much more powerful odour than the Turkish oil. The results obtained indicate the presence of the same constituents which have been observed in the Turkish oil; but in addition to these, the French oil seems to contain a powerful lævorotatory ether which suffers decomposition by hydrolysis on prolonged boiling with water. The destruction of this ethereal compound in the preparation of the Turkish oil is regarded by the authors as the cause of the milder odour of this oil, as compared with that of the French oils examined by them.

Palmarosa Oil. E. Gildemeister and K. Stephan. (*Archiv der Pharm.*, cxxxiv. 321-330.) This oil, formerly known as Turkish geranium oil, is prepared in the province of Bombay by distilling with water the leaves of *Andropogon Schoenanthus*, L. The sp. gr. of the purer samples examined varied between 0.888 and 0.896, and their rotation (in a 100 mm. tube) between +1° 40' and -1° 55'. They were all soluble in three times their weight of 70 per cent. (by volume) alcohol, and this solubility affords a convenient means of detecting impurities, many of which are insoluble in alcohol of this strength. The commonest impurity is at present paraffin—of five samples from the London Docks all contained this substance, two of them to the extent of 50 and 90 per cent. respectively. The purer oil contains 1 per cent. of dipentene, with perhaps a trace

of methylheptenone; also 12–20 per cent. of ethereal salts of acetic and normal caproic acids. The alcohol of these salts is, no doubt, geraniol, this being the only alcohol hitherto detected in the oil under examination.

Essential Oil of Bitter Almonds. F. Dietze. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 942.) Owing to the very variable proportion of hydrocyanic acid in this oil the author suggests the adoption of a standard of $1\frac{1}{2}$ to 2 per cent., the former percentage to be regarded as the lower and the latter as the higher limit of variation. For the estimation of the acid in the oil, he recommends Anton's method, according to which 2 grammes of the oil are mixed with 10 grammes of moist magnesium hydrate, 10 grammes of water, and a few drops of solution of potassium chromate, the hydrocyanic acid in the mixture being then titrated with decinormal silver nitrate. By multiplying 0.135 with the number of c.c. of the silver solution required to produce a permanent red coloration of silver chromate, the percentage of hydrocyanic acid is obtained. Adopting the limits above referred to, the volume of decinormal silver solution required in this titration should not be more than 14.8 c.c. and not less than 11.1 c.c.

Oil of Angelica Root. F. Giordani. (*Gazz. chim. Ital.*, 1896, xxvi. 315–326; *Ber. der deutsch. chem. Ges.*, xxix. 1115, 1116.) Compare also *Year-Book of Pharmacy*, 1896, 151. The volatile oil of angelica (*Angelica archangelica*) is a clear, heavy, neutral, reddish liquid, which in course of time deposits yellow crystalline scales of the composition $C_{32}H_{62}O_6$, melting at 74–77° C. After fractional distillation of the oil under reduced pressure, a solid residue remains in the flask, which when washed with ether and crystallised from hot alcohol yields a neutral substance in the form of small white crystals, which melt at 68–70° C. and have a composition corresponding to the formula $C_7H_{13}O$. The distillate from the oil, when hydrolysed with alcoholic potash and distilled in a current of steam, yields a terpene-like liquid, boiling at 240–270° C.; the residue left in the flask contains the potassium salts of methylethylacetic acid and of a hydroxypentadecylic acid, $C_{15}H_{30}O_3$. The latter acid is not present in the oil in the free state, but as an alkylic salt. The oil also affords indications of minute quantities of a phenolic constituent.

Oil of Monarda Punctata. W. R. Schumann and E. Kremers. (*Amer. Pharm. Journ.*, September, 1896, 469–472.) The authors have examined a specially distilled specimen of this oil, which

had an amber or light yellow colour, a pleasant and characteristic mint-like odour, and a specific gravity of 0.9307 at 20°. It was slightly dextrorotatory, $[\alpha]_D = +0.0588$. A crystallised phenol (m.p. 50°), present in the oil to the extent of 56 per cent., gave the characteristic reactions of thymol and carvacrol. The oil freed from thymol had a specific gravity of 0.887, and turned the plane of polarisation 1.7166° to the right in a 100 mm. tube. On fractional distillation and separate examination of the different fractions obtained, the presence of cymene and linalool was indicated. Another specimen of properly authenticated oil was also examined. This had a slightly reddish colour, a sp. gr. of 0.925 at 20°, and contained 61.22 per cent. of phenol.

Oil of Basilicum. MM. Dupont and Guerlain. (*Journ. de Pharm.* [6], 1. 453.) The authors have examined a sample of the volatile oil of basilicum, *Ocimum basilicum*, which they describe as a yellow liquid having a strong characteristic odour, a specific gravity of 0.9154, and an optical rotation of $-7^\circ 40'$ in a 100 mm. tube. The chief constituents of the oil were found to be linalool and estragol.

Constituents of Oil of Celery. G. Ciamician and P. Silber. (*Ber. der deutsch. chem. Ges.*, 1897, 492, 501 and 1419-1424.) The authors have isolated from the high-boiling portions of this oil two new constituents, viz., *sedanonic acid*, $C_{12}H_{18}O_3$, and *sedanolic acid*, $C_{12}H_{20}O_3$, the latter of which changes most readily to the corresponding lactone, $C_{12}H_{18}O_2$, for which the name *sedanolid* is proposed. A full description of these bodies and of some of their compounds and decomposition products is given.

A New Product for "Reducing" Essential Oils. J. Barclay. (*Chemist and Druggist*, 1896, 739.) The preparation reported upon in this paper is a volatile oil offered for sale under a fancy name on the London market, and is stated to be of vegetable origin and specially manufactured for the purpose of reducing (adulterating) essential oils. The following results were obtained in the author's analysis of this preparation:—

Specific gravity at 15.5° C.	0.869
Optical rotatory power in tube of 200 mm.	59°
Flashing point (Abel's method).	100° F.
Solubility in three volumes of alcohol of	
sp. gr. 0.820	Fairly soluble
Residue on evaporation	Trace

Fractional Distillation.—Percentage yielded between:—

155° and 160° F.	3.50
160° and 165° F.	55.00
165° and 170° F.	24.00
170° and 180° F.	0.00
Above 180°	8.50

There was no aldehyde present, and only a trace of the presence of ester could be discovered when the oil was subjected to saponification.

The oil appears to have the characters of a *laevo-pinene*, such as may be obtained from *Pinus sylvestris*, *Abies excelsa*, *Pinus maritima*, etc. It has a delicate odour not unlike that of some of the commercial varieties of pine oils. The author has found by experiment that considerable proportions of it may be mixed with oils of lemon and bergamot without its presence being recognisable by smell or taste. Its detection in such cases would also be difficult by the ordinary physical tests; and the author therefore lays stress upon the necessity of submitting oils like those referred to to a proper chemical examination.

Adulterated Japan Wax. C. H. La Wall. (*Amer. Journ. Pharm.*, January, 1897, 18-21.) The author calls attention to the very extensive adulteration of this drug now prevailing. Of fifty-nine cases containing from 205 to 225 pounds each, twenty-five were found to be adulterated with starchy matters to the extent of 20 to 25 per cent. The specific gravity of the sophisticated product was slightly higher than that of the genuine wax, and it was, as a rule, free from the peculiar network of minute cracks which usually characterise the surface of cakes of pure Japan wax.

Pure Spermaceti. L. F. Kebler. (*Amer. Journ. Pharm.*, 1897, 104-107.) The author confirms the conclusions arrived at in his previous investigation of spermaceti (see *Year-Book of Pharmacy*, 1896, 156), except with regard to the specific gravity of the solid material. He finds that to this constant a greater degree of variability must be ascribed, depending entirely on the crystalline or non-crystalline condition of the spermaceti operated on.

Normally, spermaceti is crystalline. From the fact that the pellets prepared for the suspensory method (described in the previous report) were non-crystalline, and of a higher specific gravity than the crystallised material, the author is led to think that the specific gravity of normal spermaceti is not much above 0.9000 and not much below 0.8900 at 15° C. The specific gravity

obtained by the suspensory method was probably abnormal, due to the non-crystalline character of the pellets. In view of the possibility of obtaining variable results for the specific gravity of solid spermaceti, it is deemed necessary to state exactly the conditions under which the observations are made; otherwise the results are worthless.

The author now recommends that the specific gravity of this substance be taken at the boiling point of water. This is done as follows:—Pour the melted spermaceti into the warmed pycnometer, insert the stopper and plunge the bottle immediately into boiling water, to such a depth that the neck of the bottle only projects. Keep the water boiling for one hour, remove the bottle, wipe well, cool and weigh. The results by this process prove to be uniform and concordant, and represent the weight of a given volume of spermaceti at 100° C.

Detection of Stearic Acid as an Adulterant in Spermaceti. E. Hirschsohn. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 297, 298, from *Pharm. Zeitschr. für Russland*.) In addition to the test with ether and alcohol, the author recommends the following method:—1 grammé of the spermaceti is dissolved in 10 c.c. of petroleum ether, and the solution (which ought to be clear) shaken with an equal volume of a $\frac{1}{10}$ per cent. solution of copper acetate. In the presence of 2 per cent. or more of stearic acid, the petroleum ether will thus assume a distinct green coloration.

Adulteration of Cantharides. M. Cabannes. (*Repertoire de Pharm.*, 1896, 395.) A parcel of adulterated cantharides received by the author proved on examination to have the following composition:—*Cantharis vesicatoria*, 25 per cent.; *Cantharis togata*, 45 per cent.; *Sylpha quartapunctata*, 20 per cent.; and *Cetonia aurata*, 10 per cent. The two last-named insects contain no cantharidin whatever, while *Cantharis togata* contains only about 0.27 per cent.

Attention is directed to the desirability of estimating the cantharidin in samples of every delivery of this drug.

A Novel Adulterant of Musk. J. T. Hornblower. (*Chemist and Druggist*, November 28, 1896, 772.) On triturating some of the contents of a musk pod with rectified spirit, the author noticed the presence of a very heavy, dark-red substance, which, on examination, proved to be cinnabar.

Detection of Adulteration in Musk by means of Röntgen Rays. M. Wolff. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 947, from *Pharm. Centralhalle*.) The author has succeeded in detecting

pieces of lead in the interior of an unopened musk-sac by means of the Röntgen rays.

Commercial Civet. J. O. Braithwaite. (*Pharm. Journ.*, 4th series, iv. 101.) The author has obtained an authentic sample of civet from civet cats in the Zoological Gardens, and has examined it together with commercial specimens of the drug. The latter differed from the authentic sample in odour, having much more the smell of rancid butter and less of the agreeable musky odour. The chief results of the chemical examination are embodied in the following table:—

	Sample from Zoological (Freed from Sawdust).	Commercial Sample A.	Commercial Sample B.	Commercial Sample C.
Loss at 100°	+	30.1	12.5	23.4
Ash	+	2.1	4.4	3.9
Petrol. Ether Ext. . .	Almost wholly soluble.	62.9	70.07	50.
Total Acid, No. of Pet- rol. Ether Ext. . .		108	166	175
Volatile Acid, No. Pet- Ether Ext.		11	11.5	9
Nature of Residue in Petrol. Ether . . .	Hairs, etc.; almost odourless.	Dry, slight odour, ster- coraceous.	Dry, slight odour, ster- coraceous.	Moist, sticky, strong ster- coraceous odour.
Sugar in Residue Insol. in Petrol. Ether . .	None.	None.	None.	Present in quantity.

The markedly lower percentage of volatile acids in the commercial samples, as compared with the authentic specimen, indicate the presence of foreign fatty matter. Sample A is noteworthy for the large amount lost on drying, and evidently contains added water. The characters of the residues differed considerably. In the case of the sample from the Zoological Gardens there was practically nothing but hair, and this residue was almost odourless. Samples A and B gave dry residues with more or less faecal odour, while C was particularly unpleasant in this respect; the sticky nature of the residue in the latter (C) was shown to be due to an adulteration of the drug with saccharine matter.

The author intends to determine the nature and composition of the volatile bodies to which the odorous properties of pure civet are due.

Arrow Poison from Larvæ. R. Boehm. (*Pharm. Journ.*, from *Pharm. Centralhalle*, xxxviii. 277.) The Bushmen of the South

African district "Kalahari" use the juice of the leaf beetle "*Diamphidia*" and its larva for poisoning their arrow-heads. Lewin (who calls the beetle *Diamphidia simplex*) found in its body, besides inert fatty acids, a toxalbumin which causes paralysis and finally death. According to the author the poison from the larva also belongs to the toxalbumins, and Starke states that it causes the dissolution of the colouring matter of the blood and produces inflammation. To obtain a solution of the poison he recommends the maceration of the whole larvæ with distilled water. After some hours they swell up, and the solution becomes light yellow coloured and is acid in reaction. This reaction still remains after shaking out with ether. The aqueous solution then has poisonous properties. The action of the poison is destroyed by boiling. It gives the usual reactions of a toxalbumin, and may be precipitated from its aqueous solution by means of sulphate of ammonia.

Poisonous Honey. L. F. Kebler. (*Amer. Journ. Pharm.*, September, 1896.) The author refers to previous records of poisoning by honey, and then reports upon a case which recently came under his own notice. The symptoms observed in this case were vomiting, purging, and acute gastric and abdominal pain, followed by loss of consciousness, coldness of extremities, feeble action of the heart, and almost complete collapse. Recovery did not take place for several hours. The effects are attributed to andromedotoxin, emanating from plants of the order *Ericaceæ*. But the presence of this poisonous principle could not be definitely established.

Physiological Action of the Alkaloids of *Hydrastis Canadensis*. K. v. Bunge. (*Chem. Centr.*, from *Arb. Pharm. Inst. Dorpat*, xi. and xii.) Hydrastinine has no effect on red corpuscles; it paralyzes the peripheral nerves and muscles. Small doses do not affect the heart, but large ones paralyze the vagus nerve. It dilates the renal vessels. The fatal dose for cats is 0.3 gramme per kilogramme of body weight. The alkaloid is eliminated unchanged, principally by the urine. Canadine increases the disposition of the blood to deposit para-hæmoglobin crystals. It has a paralyzing action on the heart, and in larger doses on the brain and spinal cord, and increases peristaltic movements. The fatal dose for cats is 0.2 gramme per kilogramme of body weight. It is only partially absorbed from the alimentary canal, and then is eliminated from the body as oxalic acid in the urine.

A New Therapeutic Application of Pilocarpine. A. Kwisda. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 940.) The author directs attention to the good results obtained by Barsky with pilocarpine hydrochloride in the treatment of diphtheria. Its action is attributed partly to the copious salivation and perspiration and their favourable influence on the elimination of the toxin, and partly to the power of pilocarpine to stimulate leucocytosis.

The application of pilocarpine in the treatment of uræmia in Bright's disease is opposed by Proben on the ground that it is liable in such cases to cause failure of the heart's action and pulmonary œdema, especially in older people.

Atropine as a Remedy in Diphtheria. M. Elsaesser. (*Therap. Monatshefte*, x. 471.) The author has obtained excellent results in the treatment of diphtheria with hourly doses of 10 to 15 drops, taken on a piece of sugar, of a solution of 3 milligrammes of atropine sulphate and 5 centigrammes of cocaine hydrochloride in 20 grammes of cherry laurel water. For children the dose is stated to be 1 drop for every year of the child's age.

Scopolamine as a Cerebral Sedative. (*Rev. de Thérap.*, lxi. 198.) Scopolamine, administered hypodermically in doses of a quarter to one milligramme, has proved a very useful sedative in certain mental disturbances. The smaller dose is given at first, and is gradually increased to the larger one. Its soothing and hypnotic effects are stated to be well marked.

Duboisine Sulphate as a Remedy for Epilepsy. MM. Cividali and Gianelli. (*Lancet*, and *Chemist and Druggist*, June 5th, 1897.) The authors report that sulphate of duboisine diminishes the number and intensity of epileptic attacks. The drug was administered in doses of $\frac{1}{120}$ grain increased to $\frac{1}{60}$ grain, and the most favourable results were obtained in the cases of epilepsy associated with psychical disorders.

Chelidonium as an Anodyne. (*Pharm. Zeitung*, xlii. 107.) The sulphate, phosphate, and tannate of this alkaloid are recommended in the place of opiates for the relief of pain in the stomach and bowels and as a sedative in ulcerated conditions of the stomach. The dose is 0.1 to 0.2 gramme.

Morphine Hydrochloride as an Antidote to Potassium Cyanide. L. Heim. (*Münch. Med. Wochenschr.*, 1896, No. 37.) Experiments on animals have shown that morphine hydrochloride and potassium cyanide have a decidedly antagonistic action, and appear to justify the conclusion that subcutaneous injections of

the morphine salt may prove a valuable antidote in cases of poisoning by cyanides.

Tropacocaine as a Substitute for Cocaine. M. Vamossy. (*Rev. de Thérap. Méd. Chirurg.*, lxiii. 188, from *Thérap. Wochenschr.*) On the grounds that tropacocaine is less than half as toxic as cocaine, while the anæsthesia it produces is as rapid and more lasting, the author proposes to substitute the former for the latter in medical practice. He observes that tropacocaine gives rise to little or no mydriasis when employed in the eye. For general use he prescribes the following solution:—Hydrochloride of tropacocaine, 30 centigrammes; sodium chloride, 6 centigrammes; distilled water, 10 grammes.

Physiological Action of Choline, Neurine, and Allied Substances. F. W. Mott and W. D. Halliburton. (*Proc. physiol. Soc.*, 1897, 18-20. From *Journ. Chem. Soc.*) When injected into the circulation, small doses of choline hydrochloride cause a marked temporary fall of blood pressure, which is cardiac, and not peripheral in origin. It occurs also after section of the vagi. Neurine hydrochloride produces a preliminary fall and a subsequent rise of pressure, respiration being slowed and deepened. This drug is more toxic than choline, less than a decigramme being the fatal dose in a dog; respiration ceases before circulation.

The physiological interest of these observations is derived from the fact that the cerebrospinal fluid, in cases of brain disease, where, as in general paralysis of the insane, there is great wasting of the brain substance and disintegration of its cells, produces exactly the same effects as solutions of choline. Normal cerebrospinal fluid is innocuous; the toxicity of the pathological fluid is due to some non-proteid substance precipitable by phosphotungstic acid. It is probable that this substance is choline, derived from the lecithin of the brain. If this is the case, the enfeebled circulation with severe fainting fits and fatty degeneration of the heart, so frequently seen in cases of general paralysis, will be in part accounted for. The blood removed by venesection from patients during the fits contains the same substance.

Therapeutic Properties of Piperidine. C. Goldschmidt. (*Chem. Zeitung*, 1897, 44.) The author reports that an investigation is in course of progress respecting the value of piperidine in gout, uric acid calculus, and gravel. The supposition of its usefulness in these cases is based on the observation that piperidine has a powerful solvent action on uric acid, and that piperidine urate far exceeds the piperazine salt in its solubility. The poison-

ous properties of piperidine do not appear to render it objectionable for this purpose, since it is found that a highly diluted solution suffices to act on uric acid in the manner referred to.

Chaplin and Tunnicliffe (*Brit. Med. Journ.*) have obtained very favourable results with *piperidine guaiacolate* in the treatment of pulmonary phthisis. This compound may be safely given in doses of 0.2–1.5 gramme three times daily; it is well borne by the stomach, and is found to have a favourable effect on the appetite and strength of the patient. It appears to combine the antiseptic properties of guaiacol with the cardio-vascular action of the piperidine. The compound has the formula $C_5H_{11}N.C_7H_8O_2$, and is obtained by the action of piperidine on guaiacol in a benzol or petroleum ether solution. It forms needle-shaped or tabular prisms, which are readily soluble in water. By alkalis or mineral acids it is split up into its components.

Piperazine and Lysidine in Uric Acid Diathesis. W. Goodbody. (*Brit. Med. Journ.*, 1896, 903.) As the result of an extended chemical examination of the urine secreted under the influence of piperazine and of lysidine, the author finds that both, when added to a urine tending to deposit uric acid gravel, are capable of hindering the deposit on standing. The experiments further show that lysidine exerts a more powerful solvent action on uric acid than piperazine. Both, when taken internally, increase the elimination of the acid, not by increasing its formation, but by rendering the blood more capable of removing it from the tissues; so that prolonged administration of these drugs causes a diminution of the quantity of acid eliminated by the kidneys. Both are diuretics, and cause an increased output of nitrogen, partly due to the increase of uric acid, and partly to the increased volume of the urine excreted.

Therapeutic Properties of Urea. G. Klemperer. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 917.) The author has previously called attention to the value of urea as a diuretic and as a solvent of uric acid (see *Year-Book of Pharmacy*, 1896, 158). He has now also obtained good results with it in the treatment of pleuritic exudations and in cirrhosis of the liver. He administers a tablespoonful of a 5 per cent. solution every hour, in all about 10 grammes of urea per day. After two days the strength of the solution is raised to $7\frac{1}{2}$ per cent., and after four days to 10 per cent. Milk and seltzer water are recommended as vehicles. Urea may also be prescribed in the form of powder mixed with sodium bicarbonate and calcium carbonate.

Physiological Action of Santonin Derivatives. Lo Monaco. (*Ber. der deutsch. chem. Ges.*, 1896, 688, 689.) Desmotroposantonin and isodesmotroposantonin, both of which are isomerides of santonin, are much less poisonous than santonin itself, and can be safely given in larger doses. Hyposantonin, isohyposantonin, and santoninamin, however, exceed santonin in their toxicity.

Antipyrine as an Obstetric Anæsthetic. M. Savitsky. (*Brit. Med. Journ. Epit.*, 2, 1896, 10.) One gramme doses of antipyrine combined with 15 to 20 drops of tincture of opium, administered in an enema and repeated, if necessary, after 2 to 6 hours, is found by the author to be a valuable anæsthetic in labour, promptly relieving the pain and checking hæmorrhage.

Further Evidence of the Value of Lactophenin in Typhoid Fever. R. Jaksch. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 160.) This remedy, which was introduced into therapeutics a few years ago (see *Year-Book of Pharmacy*, 1895, 182), has now been extensively tried by the author in a recent epidemic of typhoid fever at Prague. He gives a highly favourable account respecting its action, and considers the results obtained with it as more satisfactory than those of any other treatment he has yet tried.

Paraldehyde in Asthma. (*Brit. Med. Journ.*, 1, 1896, 725, and *Pharm. Journ.*) Attention is called by Hearder to the valuable, but little known, property of this drug as an antispasmodic in asthma. With a dose of 45 to 60 minims relief is generally rapid and complete, a few cases requiring a second dose of 30 to 45 minims at the expiration of an hour.

Ill Effects of Saccharin. (*Brit. Med. Journ.*, 1897, 715.) According to Hogarth, the prolonged consumption of small doses of saccharin is apt to produce severe pain in the region of the stomach and pancreas. The pain disappears with the discontinuance of the drug.

Therapeutic Properties of Methylene-Blue. H. Röttger (*Nouv. Rem.*, xii. 399); J. Moore (*Brit. Med. Journ.*, January 16th, 1897, 140); also B. Lewy (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 917). Röttger has obtained very successful results with the internal administration of methylene-blue in the treatment of malaria. It was given in doses of 0.1 gramme, six or eight times a day for eight to thirty days. Beyond a slight nausea at the beginning of the treatment, no ill effects whatever were produced in any of the cases.

J. Moore reports most favourably on the value of methylene-

blue as an internal remedy in the treatment of gonorrhœa. He was led to the idea of investigating the action of this and other anilines in consequence of the success which has attended the application of pyoktanin as an injection; and he found that of the various substances experimented with methylene-blue gave the best results. Administered in doses of 3 grains three times a day, it appears to produce a marked and beneficial effect on the disease and to cut short the acute stage before any serious injury is done to the urethral tissues. The risk of troublesome complications and sequelæ is thus much lessened. The drug seems to possess the power of interfering with the development and virulence of the micrococci (gonococci) causing the disease.

B. Lewy has successfully employed methylene-blue in doses of 0·1 gramme in neurasthenia, nervous headache and neuralgic pains generally. Four such doses given during the day were usually found sufficient to remove the pain.

Chrysoidin and Cholera. (*Brit. Med. Journ. Epit.*, 1, 97, 28. From *Pharm. Journ.*) Blachstein states that chrysoidin precipitates cholera bacilli from a suspension of these microbes. Two interesting facts are connected with this flocculent precipitation; namely, (1) that the same peculiarity belongs to the serum of those immune against cholera; and (2) that no other body except chrysoidin is known to possess this property. It not only acts as a precipitant, but also as a disinfectant for cholera, being in this respect more active than phenol. It is not poisonous. A solution of 1 in 1000 may be taken in teaspoonful doses without harm. It might be used with advantage for disinfecting water. It does not appear to act as a curative agent when taken internally, but is a good prophylactic. Animals inoculated with cholera bouillon containing chrysoidin continued to live, while the same bouillon without the dye caused infection.

Effect of Thyroid Treatment on Metabolism. B. Schöndorff. (*Ber. der deutsch. chem. Ges.*, from *Pflüg. Archiv*, lxiii. 423, 424.) The author's experiments were conducted on a dog weighing 24 kilogrammes, the diet being so regulated as to keep the consumption and output of nitrogen in a state of equilibrium. After 23 days, during which 5 to 10 thyroid tablets were administered daily, there was a loss of 1 kilogramme in body weight, while the nitrogen equilibrium remained undisturbed. After a second period of the same duration, during which 20 tablets were administered daily, the loss of body weight amounted to 2·2 kilogrammes. The nitrogen no longer remained at an equilibrium,

but showed a negative balance of -30.62 grammes. The administration of the tablets was now discontinued, all other conditions remaining the same; the result was an increase of 1 kilogramme in weight and a nitrogen balance of $+24.14$ grammes. Finally, large quantities of fat (lard) were added to the regular diet, with the result of increasing the body weight to the extent of 4 kilogrammes. In the author's opinion, it may be definitely assumed that thyroid treatment does not cause a waste of proteïds until it has effected the removal of superfluous fat.

Physiological Action of the Suprarenal Capsules. S. Fränkel. (*Wien. Med. Blätter*, 1896, Nos. 14, 15, 16. From *Journ. Chem. Soc.*) The main action of an extract of the medulla of the suprarenal capsules when injected into the circulation is a rise of blood pressure. This is due to peripheral action on the small vessels, as Schäfer and Oliver have shown; and, according to Moore, this is caused by a reducing substance originally described by Vulpian. The present research is directed to an examination of this substance; this was separated by extraction with alcohol and acetone, but not crystallised. The name *spygmo-genin* is suggested for it. Its chemistry is not yet fully worked out, but its reactions point to its being a nitrogenous derivative of the orthodihydroxybenzene series.

The Active Constituent of Suprarenal Capsules. B. Moore. (*Journ. Physiol.*, 1897, 382-389.) The author arrives at the conclusion that the constituent to which these capsules owe their marked physiological action is a pyridine derivative, and may possibly be piperidine.

Synovial Extract in Rheumatoid Arthritis. (*Pharm. Journ.*, 4th series, iii. 39.) This new animal extract has been tried by Dr. Hyde (Buxton) in chronic intractable cases of rheumatic joint trouble. The extract is obtained from fresh articular cartilages and synovial membrane of healthy animals by means of glycerine, 1 minim being equal to 1 grain of the fresh animal substance, and 15 to 30 minims being given three times a day. Good results have so far been obtained, and more extensive trials of this mode of treatment are considered desirable.

Serum Treatment of Measles. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 573.) Weisbecker has obtained very promising results in the treatment of measles by injections of a serum taken from measles patients during convalescence. Several severe cases complicated with pneumonia were rapidly relieved by this treatment.

Serum Treatment of Leprosy. J. de Dios. (*Pharm. Journ.*, 4th series, iv. 337, 338.) The author gives the results obtained in the treatment of leprosy by means of serum from a horse which had been repeatedly inoculated with the blood serum of a leper. For further particulars the above source should be referred to.

Tetanus Antitoxin. L. Knorr and Behring. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 819, from *Deutsch. Med. Wochenschr.*) The authors report that they have succeeded in producing an active tetanus antitoxin, with which they have obtained both prophylactic and curative effects in their experiments on animals. For curative purposes it is used in a dry, and for prophylactic use in a liquid form. The curative dose for horses is 5 grammes of the dry substance, which is dissolved in 45 c.c. of sterilised water at 40° C. Both in animals and men intravenous injection of the remedy is superior to its subcutaneous application. The antitoxin for prophylactic purposes is a liquid preparation of which 0.5 to 5 c.c. is a dose for subcutaneous injection. This liquid preparation requires an addition of phenol for its preservation, while the dry antitoxin as such is not liable to decomposition; if the latter, however, is intended to be kept in the form of a solution, it requires the addition of 1 per cent. of chloroform.

This new antitoxin is stated to be 100 times as active as the serum previously prepared by Behring for the treatment of tetanus.

Electrolytic Diphtheria Antitoxin. M. Smirnow. (*Nature*, lv. 597, and *Pharm. Journ.*, 4th series, v. 368, from *Arch. des Sciences Biol.*) The author has produced a diphtheria antitoxin of great efficacy by electrolysing virulent diphtheria broth cultures, the saving in time and expense over the ordinary method being very great. The new preparation is claimed to entirely protect animals from the effects of diphtheria poison, even when employed in smaller quantities than the ordinary therapeutic serum, whilst in itself the artificial antitoxin is said to be quite harmless.

Resorcin as a Prophylactic against Diphtheria. (*Pharm. Zeitung*.) Binnet recommends a 0.5 per cent. solution of resorcin for rinsing the mouth and nose as a prophylactic against diphtheria. Its antiseptic action is stated to be stronger than that of boric acid and other disinfectants which have been suggested for the same purpose.

Application of Sodium Hyposulphite in Diphtheria. (*Lancet*, 1896, 1562.) A solution consisting of equal parts of glycerine and saturated aqueous solution of sodium hyposulphite, locally applied to the membrane, by means of a brush, has been successfully used

by Wickers in diphtheria. The application is repeated two or three times daily.

Sodium Chlorate in Uterine Cancer. (*Brit. Med. Journ., Epit.*, 2, 96, 70, from *Wien Med. Presse; Pharm. Journ.*, 4th series, iv. 158.) Duvrac has found this salt useful, both as an internal remedy and as a local application, in the treatment of uterine cancer. The effect, however, is only palliative, the course of the disease being unchecked in the deeper tissues, which cannot be reached by the local dressings.

Therapeutic Properties of Sodium Tellurate. M. Jognet. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 54, from *Bull. Commenc.*) This preparation is recommended by the author for the relief of the troublesome night-sweats of phthisical patients. It is given in the form of a solution of 0.1-0.2 gramme in 50 grammes of alcohol, of which a teaspoonful is administered at noon and in the evening.

Therapeutic Properties of Strontium Lactate. M. Bronovski. (*Bull. Gén. de Thérap.* [6], i. 167.) Further experience with this remedy confirms its value as a diuretic, while showing at the same time that it does not increase the excretion of albumin in cases of nephritis. It possesses but very slight antiseptic properties, and therefore does not diminish intestinal decomposition.

Hygienic Studies on Copper. K. B. Lehmann. (*Chem. Centr.*, from *Arch. Hyg.*, xxiv. 1-17, 18-72, 72-83.) The author finds that copper occurs normally in a greater number of unsophisticated articles of diet than has been hitherto supposed, and that an adult's daily consumption of this metal under ordinary circumstances amounts to about 20 milligrammes. A daily quantity of more than 120 milligrammes is considered by him as harmful, and this proportion is often reached and even much exceeded by the consumption of preserved vegetables.

Arsenic as a Prophylactic in Scarlet Fever. M. Sperawsky. (*Revue de Thérap.*, lxiii. 625.) The author has obtained remarkably successful results with arsenic as a protective agent against scarlet fever. In addition to its marked prophylactic action, this remedy seems to be also capable of exercising a favourable influence on the course of the actual disease.

Arsenic Hæmol (Hæmolum Arsenicosum). (*Merck's Bericht* for 1896.) In addition to the iodine, bromine, copper, mercury, and zinc compounds of hæmol, which are already in use, an arsenic hæmol is now introduced into therapeutics. It is described as a brown powder consisting of hæmol with 1 per cent. of arsenious

acid. It is indicated in all cases in which arsenic medication appears desirable, and is administered in the form of pills made according to the following formula:—Arsenic hæmol 5·0 grammes, succ. glyc. pulv. 1·25 gramme, mucil. acaciae q.s.; f. pil. 50. Three pills to be given daily, the dose to be increased by one pill every fourth day until 10 pills are taken daily.

Cacodylates as Therapeutic Agents. (*Pharm. Zeitung*, xlii. 106.) Cacodylic acid (dimethylarsenic acid), $\text{As}(\text{CH}_3)_2\text{O}(\text{OH})$, forms odourless, oblique, rhombic prisms, which melt at 200°C ., and are readily soluble in water and alcohol. The sodium salt, $\text{As}(\text{CH}_3)_2\text{ONa}$, is a white amorphous powder soluble in water, and is recommended in doses of 0·25 gramme internally, or in 0·1 gramme doses subcutaneously administered, in the place of the ordinary arsenic compounds now used in medicine.

Physiological Action of Uranium Salts. M. v. Angermayer. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 54.) S. West has recommended uranium nitrate in doses of 0·3–0·6 gramme three times daily in the treatment of diabetes (*Brit. Med. Journ.*, September 19th, 1896). Referring to this suggestion the author points out that uranium salts have been shown by Chittenden in 1887 and Woroschilzky in 1889 to be powerful protoplasmic poisons, surpassing arsenic in their toxicity; and that Kobert also has called attention to the slow but none the less very dangerously toxic action of these salts.

Potassium Permanganate as a Remedy for Skin Diseases. (*Therap. Gaz.* [3], xii. 258, and *Pharm. Journ.*) The local application of a 1 or 2 per cent. solution of potassium permanganate is found by Bulkley to allay the troublesome itching of pruritus and other skin diseases. It is painted over the itching surface and allowed to dry.

Value of Formaldehyde as a Surgical Antiseptic. M. Trétrop. (*Bull. Gén. de Thérap.*, cxxxi. 376.) The author gives a very favourable account of the value of formalin as a surgical antiseptic. Irrigations and dressings with this solution speedily stop the formation of pus, keep wounds in an aseptic condition, and favour rapid healing.

Properties and Uses of Formaldehyde. F. C. J. Bird. (*Pharm. Journ.*, 4th series, iii. 269–271.) The following table is given as showing the purposes for which formaldehyde has been employed, and the proportions recommended. Two and a half parts of the 40 per cent. solution may replace each part of formaldehyde:—

A solution of Formaldehyde containing	Effects produced.
1 part in 125,000 parts . . .	Kills anthrax bacilli.
" 50,000 " . . .	Prevents the development of typhus bacilli, etc.
" 32,000 " . . .	Preserves milk for several days.
" 25,000 " . . .	Forms a useful injection in leucorrhœa, etc.
" 20,000 " . . .	Preserves wines, weak alcoholic liquids, and beer, also milk for several weeks.
" 4,000 " . . .	Recommended for moistening paper used to cover jam, etc.
" 3,200 " . . .	For rinsing dairy vessels, etc.
" 2,500 " . . .	Destroys the most resistant micro-organism in one hour.
" 2,000 " . . .	For rinsing casks and vessels intended for liquids liable to fermentation.
" 500 " . . .	For the irrigation of catheters, etc., and as a mouth-wash.
" 250 to 200 " . . .	A general disinfectant solution for washing hands, instruments, etc., in surgery, spraying in sick rooms, and as a deodorant.
" 160 to 100 " . . .	For hardening microscopic tissues, which should be immersed for a considerable time to give the best results.
" 100 " . . .	In lupus, psoriasis, and skin diseases.
" 50 to 25 " . . .	Sterilises surgical catgut, silk, etc., by steeping.
" 25 " . . .	For quickly hardening and preserving for microscopical sections; longer immersion in a weaker solution gives better results.
" 10 ") . . .	For hardening very firm tissues
" 5 ") . . .	" firm tissues
" 2½ ") . . .	" soft "
	{ In pathological and histological work.

Besides dealing with the various uses of formaldehyde, the author also gives a useful summary of the tests for the detection and estimation of this substance. The original paper should be consulted for particulars.

Comparative Efficiency of Formaldehyde and Sulphurous Acid as Disinfectants. W. Blyth. (*Pharm. Journ.*, 4th series, iv. 469.) In a comparative trial pieces of linen on which were cultures of the bacilli of diphtheria, typhoid, anthrax, and tuberculosis were exposed to the two gases in separate rooms for nineteen hours. Subsequent examination of the infected pieces of linen by Prof. Macfadyen showed the following results:—

Organism.	Sulphurous Acid.	Formic Aldehyde.
Diphtheria bacillus . . .	No growth	No growth
Typhoid bacillus . . .	Good growth	No growth
Anthrax bacillus . . .	Good growth	No growth

Contamination with other organisms prevented the tubercle samples being properly reported on.

Preservatives of Pharmacopœial Preparations. W. Martindale. (*Pharm. Journ.*, 4th series, iv. 227-230; also *Chemist and Druggist*, 1897, 418, 419.) This paper discusses the merits of the following substances as agents for the preservation of pharmacopœial preparations:—Alcohol, glycerine, acetic acid, sugar, salicylic acid, benzoic acid, carbolic acid, sulphurous acid, boric acid, camphor water, chloroform, chloral hydrate, cherry laurel water, formaldehyde, and hypophosphorous acid. The reader is recommended to refer to the original paper, since this cannot be adequately dealt with in the form of a brief abstract.

Preservation of Eserine Solutions. M. Pannetier. (*Repertoire de Pharm.*, 1896, 483.) It is well known that eserine salts (especially the sulphate), when exposed to the air, soon assume a yellow or red tint and lose their crystalline appearance. These changes are attributed by Duquesnel to the formation of an oxidation product, *Rubeserine*. In order to prevent such oxidation, the author suggests the adoption of the following precautions:—(1) Only pure and perfectly dry eserine salts should be used in pharmacy; and it is advisable to keep them in a bottle fitted with a desiccator-stopper to prevent the absorption of moisture. (2) For solutions, only distilled water, which has been well boiled and allowed to cool, should be used. (3) The solutions should be kept in a dark place and well protected from the air.

Solid Extracts and their Standardization. C. H. La Wall. (*Amer. Journ. Pharm.*, July, 1896, 366-371.) The author comments on the continued want of uniformity in the strength and consistence of these preparations, and suggests that convenient and appropriate standards should be adopted for the solid extracts of drugs containing readily determinable principles. He also advocates the addition of 4 or 5 per cent. of glycerine to the nearly finished extract, in order to prevent any appreciable alteration in consistence on keeping. In addition to the extracts of nux vomica and opium, for which standards have already been adopted, he recommends the application of the principle of standardization to the extracts of aconite root, belladonna leaves, cinchona, colchicum, conium, hyoscyamus, physostigma, and stramonium seed. The paper concludes with the following list of average yields of extracts obtained from a number of official and unofficial drugs:—

Drug.	Per Cent. of Extract Obtained.
Cannabis indica	13
Cimicifuga	30
Digitalis	20
Ergot	14
Gentian	35
Licorice, purified	55
Jalap	27
Juglans	12
Leptandra	27
Quassia	35
Rhubarb	30
Taraxacum	35
Uva ursi	30
Logwood	5
Xanthoxylum	6
Gelsemium	10
Conium leaf	30
Hamamelis	25
Triticum	18
Kava Kava	7
Pulsatilla	24
Serpentaria	10
Chirata	15
Buchu	14
Cornus florida	7
Fucus vesiculosus	26
Cubeb	20
Colchicum seed	16
Damiana	11
Iguatia amara	19
Sumbul	28
Rumex	40
Viburnum prun.	15
Senega	46
Cotton-root bark	10
Calumba	17
Valerian	20
Viburnum opulus	23
Scutellaria	35
Calendula	30
Jaborandi	25
Grindelia robusta	20
Colchicum (acetic)	25
Scoparius	17
Rubus	25
Salvia	25

Alkaloid-Assay of Extracts. C. Kippenberger. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 865, 866, from *Apoth. Zeitung*.) The extract is dissolved in warm acidified water, the solution filtered, allowed to cool, then nearly neutralised, and mixed with an iodine solution containing 12·7 grammes of iodine and 60 grammes of potassium iodide per litre. The precipitate thus formed is allowed to settle, collected on a filter, repeatedly washed with cold water, then dissolved in a small quantity of acetone, this solution treated with sodium hydrate, and afterwards acidified with hydrochloric acid and diluted with water. This mixture is now shaken with several successive portions of petroleum ether in order to remove impurities as well as the acetone and free iodine. The separated aqueous solution is heated on a water-bath to expel any acetone or petroleum ether still present, then mixed with a few drops of sodium hyposulphite, and subsequently with an excess of sodium carbonate; it is then repeatedly extracted with a suitable alkaloid-solvent (chloroform, chloroform and ether, or chloroform and alcohol, according to the nature of the alkaloid present). Finally the alkaloid solution thus obtained is evaporated and the residue dried.

Drugs may be assayed in the same manner, after first being extracted either by acidified water, alcohol, or other menstruum best suited to the drug in question. The extract is then proceeded with as above.

Adulterated Fluid-Extracts. F. W. Haussmann. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 940, 941, from *Boll. chim. farm.*) The author has repeatedly observed the presence of glucose in certain commercial fluid extracts in which it ought not to occur. He attributes its presence in such cases to the use of caramel as a colouring agent, and states that this admixture may be readily detected by mixing a small quantity of the extract with an excess of solution of lead subacetate, filtering, and removing the excess of lead with dilute sulphuric acid. The re-filtered liquid ought to be colourless; if coloured, it contains caramel.

Constituents and Assay of Extract of Male-Fern. F. Kraft. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 789-791.) The author's examination of this extract shows the presence of a new constituent, *filiæ-wax*, which he describes as a pale brownish-yellow, amorphous substance, which melts at 69° C., and is readily soluble in hot alcohol or petroleum ether, but difficultly soluble in hot ether. It occurs in large proportion in extracts prepared from immature rhizomes, which are comparatively poor in filicic acid;

but smaller proportions of the wax occur in all samples of the extract and are the cause of the turbidity of the ethereal percolates obtained in the extraction of the rhizome. Neither filix-wax nor the essential oil contained in the rhizome possesses any pharmacological significance whatever.

The resinoid bodies occurring in the rhizome, and forming a group together with the filicic acid, appear to consist of *filix-red* (a hydrolytic product of *filix-tannin*), and further decomposition products of the latter.

With regard to filicic acid the author finds that the melting point of this substance is not 184.5°C . as stated by Poulsen, but $179\text{--}180^{\circ}\text{C}$. He regards filicin and filicic acid as two physically different kinds of filicic acid, of which the crystalline preparation (Poulsen's filicin) is practically inert, while amorphous filicic acid, especially in its solution in a fixed oil as it occurs in the extract, must be regarded as the sole active principle of the drug.

An approximate test for the quality of the extract may be performed on the basis of Daccomo's method of preparing filicic acid. For this purpose 1 gramme of the extract is dissolved in 1 c.c. of ether, and the solution mixed with 2 c.c. of alcohol; an amorphous precipitate is thus formed having about the colour of the extract. Upon standing, this deposit thickens, and remains otherwise unaltered in the case of extracts of poor quality, whereas in the case of good extracts it shows after 24 hours a copious separation of yellow crystalline grains of filicic acid at the bottom of the test-tube, which are readily distinguished from the surrounding muddy sediment, and further increase in quantity after another 24 hours.

For the proper assay of the extract, or the determination of the actual percentage of the filicic acid present, the author recommends the following process:—5 grammes of the extract are shaken for a quarter of an hour with 60 grammes of 95 per cent. alcohol and a solution of 2 grammes of potassium carbonate in 40 grammes of water, after which 80 grammes of the mixture are quickly filtered into a separating funnel, and agitated therein with 50 grammes of ether, 35 grammes of water, and 9 grammes of dilute hydrochloric acid. The ethereal layer, after separation, is washed with another 35 grammes of water, and then slowly evaporated in a 100 c.c. Erlenmeyer flask until only about 2 grammes or less remain. The residue is dissolved in 1.5 gramme of hot amyl alcohol, the solution mixed with 5 grammes of methyl alcohol, the mixture precipitated slowly by the very gradual addition of another 25 grammes of methyl alcohol, and allowed to

stand in the stoppered flask overnight in a very cool place. The precipitate is then collected on a tared filter, washed with 10 c.c. of methyl alcohol, and both the filter and flask dried at 60–70° C. until the weight is constant. This weight represents the proportion of filicic acid contained in 4 grammes of the extract. The author has found the filicic acid in a number of extracts examined to vary between 0.4 and 10 per cent.; but he considers that a good extract ought not to contain less than 5 per cent. The statements of Dacomo and Scoccianti that the acid may amount to 11–42 per cent. is regarded as entirely erroneous, and is attributed to the fact that the filicic acid separated by the process of these investigators is contaminated with the entire quantity of resinoid bodies occurring in the extract.

Constituents of the Ethereal Extract of Male-Fern. R. Boehm. (*Pharm. Zeitung*, xlii. 79.) The author has obtained from this extract about 3 per cent. of a colourless crystalline constituent of the composition $C_{23}H_{27}O_7$, for which he suggests the name *aspidin*. This substance fuses at 124.5° C., is insoluble in water, but soluble in alcohol, ether, benzol, and alkalies. It is poisonous, but its therapeutic action has not yet been definitely investigated. In addition to *aspidin*, the author has isolated *albaspidin*, *aspidinin*, *aspidinol*, and several acids from the extract.

Assay of Fluid Extract of Coca and of Coca Leaves. A. R. L. Dohme and L. F. Kehler. (*Amer. Journ. Pharm.*, September, 1896, 513, 514.) Shake a mixture of 10 grammes of the fluid extract and 10 grammes of water with 25 grammes of chloroform and 75 grammes of ether in a 250 c.c. flask; then add 5 grammes of 10 per cent. solution of ammonia, and agitate the mixture frequently during half an hour.

(a) After complete separation, pour off 50 grammes of the chloroform-ether mixture into a flask or beaker, evaporate the solvent on the water-bath, add 10 c.c. of ether, and evaporate again. Dissolve the varnish-like residue in 15 c.c. of pure alcohol with heat, add sufficient water to produce slight permanent turbidity, then add the indicator (preferably hæmatoxylin) and a slight excess of the standardized acid, and titrate with centinormal solution of alkali.

(b) When the mixture has separated entirely, pour off 50 grammes into a separating funnel, treat at once with 20 c.c. of acidulated water; after thorough agitation and complete separation, remove the 20 c.c. of water into a second separating funnel. Repeat this operation twice more with 15 c.c. of acidulated water.

Then render the acidulated water in the second funnel alkaline with ammonia, remove the alkaloids successively with 20 c.c. and 15 c.c. of a mixture of 3 parts (by volume) of chloroform and 1 part of ether; collect the chloroform-ether mixture in a tared flask, and distil off the solvent. Now treat the varnish-like residue twice with 8 c.c. of ether, evaporate the latter, and finally dry on a water-bath and weigh. After this, dissolve the varnish-like residue in 15 c.c. of pure alcohol with the aid of heat, and proceed as in (a) above.

For the assay of coca leaves, shake 10 grammes of the dry, finely powdered drug with 25 grammes of chloroform and 75 grammes of ether in a 250 c.c. flask for several minutes, then add 10 grammes of 10 per cent. solution of ammonia, and agitate frequently during one hour. Now add another 10 grammes of solution of ammonia, shake well, wait till the liquid becomes clear, and decant it from the agglutinated powder. Finally treat 50 grammes of the chloroform-ether mixture according to the above process *b*.

Nux vomica may be assayed in the same manner according to *a* and *b*.

Method of Testing Ergotin (Fluid Extract of Ergot). C. C. Keller. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 325.) (1) A solution of 1 c.c. of the sample in 8 c.c. of water, when mixed with 1 c.c. of Mayer's reagent (13.546 grammes of mercuric chloride and 49.8 grammes of potassium iodide per litre), should yield a clear or only very slightly opalescent mixture. A marked turbidity would indicate an acid reaction, which is inadmissible in a preparation intended for hypodermic use. On adding 5 drops of dilute sulphuric acid to the mixture a copious precipitate is formed, which, in the case of Keller's ergotin, is yellowish white, whereas in that of other preparations it is pale brown to dark brown, according to the amount of colouring matter and extractive present in the sample.

(2) Keller's Cornutine Reaction:—A solution of 0.5 c.c. of the sample in 1.5 c.c. of water is mixed with 1 drop of solution of ammonia, and well shaken with 8 c.c. of ether. After complete separation, the clear ethereal solution is evaporated, the residue dissolved in 1.5 c.c. of acetic acid to which a trace of ferric chloride has been added, and 1.5 c.c. of concentrated sulphuric acid is now very carefully added to the solution so as to avoid any shaking. A fine blue violet coloration will thus be developed in the zone of contact between the two liquids, which is characteristic

of cornutine, but is only obtained if a satisfactory proportion of this alkaloid is present in the sample tested.

Elixir Ergotæ Ferratum. M. F. Gay. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 599.) This preparation has been introduced with the object of combining ergotin and iron in a palatable and readily digestible form. The author considers it as very suitable in hæmorrhage, weakness, and catarrh of the uterus. Its composition is as follows:—

Extract. ergot.	. . . . .	1.0
Ferr. ammon. citrat.	. . . . .	10.0
Glycerini	. . . . .	100.0
Spirit. vini rect.	. . . . .	300.0
Spirit. meliss. comp.	. . . . .	30.0
Syrup. simpl.	. . . . . q.s.	ad 1000.0

A tablespoonful of this elixir contains about 0.2 gramme of citrate of iron and ammonia and 0.02 gramme of ergotin (extract of ergot).

Ergotinol. (*Berlin. klin. Wochenschr.*, 1897, 8.) This new ergot preparation has been introduced by Vosswinkel, and is stated by Abel to be obtained in the following manner:—Powdered ergot is freed from oil and exhausted with water. The aqueous solutions are treated with acid and hydrolysed, after which the acid is neutralised and the liquid subjected to alcoholic fermentation. When the fermentation is completed the product is dialyzed, and then concentrated by evaporation until 1 c.c. of the resulting ergotinol corresponds to 0.5 gramme of extract of ergot.

Ergotinol is a suitable substitute for ergotin (extract of ergot), as it is equally certain in its action without sharing the unpleasant secondary effects of the latter.

Palatable Extract of Cascara Sagrada. E. Urban. (*Pharm. Rev.*, xiv. 270.) The author's process for the preparation of an aromatic bitterless extract of cascara sagrada chiefly differs from those hitherto published in the use of lime-milk in the place of calcined magnesia. His directions are as follows:—1000 grammes of the ground bark are intimately mixed with 150 grammes of powdered liquorice root and 100 grammes of freshly slaked lime and 1 litre of water. The mixture is allowed to stand for 10 to 12 hours, at an ordinary temperature, then dried at 40 to 50° C., and afterwards uniformly moistened with 400 c.c. of a mixture of 500 c.c. of alcohol, 250 c.c. of glycerine and 250 c.c. of water. The mixture is transferred to a percolator, and extracted with the remainder of the menstruum named and subsequently with water

until the drug is completely exhausted. The first 850 c.c. of the percolate are collected separately; the remainder is evaporated to the consistence of a syrup, which is then added to the first percolate, along with 12 c.c. of compound spirit of orange, and the mixture is then made up with dilute alcohol to 1000 c.c.

Rhamnus Saccharatus. J. E. De Vrij. (*Apoth. Zeitung*, from *Pharm. Weekbl.*, No. 27.) This standardized preparation introduced by the author is prepared from *Rhamnus frangula* bark which is at least 12 months old, and in a portion of which the amount of extractive has been previously determined. This bark is extracted with water, the resulting liquid evaporated to dryness in vacuo, and the residual extract intimately mixed with a quantity of sugar of milk exactly sufficient to make the yield of the product equal to the weight of the bark employed. The percentage of extractive in the finished preparation should therefore be equal to that found in the bark in the preliminary assay.

Acetic Acid as a Menstruum and Solvent. J. P. Remington. (*Amer. Journ. Pharm.*, 1897, 121-126.) The object of the author's experiments was to ascertain whether acetic acid can advantageously replace alcohol in the extraction of a drug like nux vomica. His results distinctly supply an affirmative answer to this question. Sanguinaria, kola, ipecacuanha, squill, cinchona, and colchicum seed are also referred to as having been experimentally exhausted with acetic acid. On the whole, it appears that acetic acid may prove useful in the case of drugs difficult to exhaust, and that the solid extracts thus obtained may be readily assayed and standardized. For the preparation of tinctures, these extracts can be dissolved in mixtures of alcohol and water of different strengths, with or without the addition of glycerine; and if the proper menstruum be chosen, nothing but an inert residue will be left undissolved, and may be removed by filtration. The bulk of the author's experiments were made with nux vomica and a 10 per cent. acetic acid, and the results are unquestionably encouraging.

Preparations of Strophanthus. H. C. Wood and W. S. Carter. (*Amer. Journ. Pharm.*, July, 1896, 353-358.) The authors have carried out a series of experiments on animals in order to test the activity of the best commercial strophanthin and of an extract of strophanthus. The extract used in these experiments was obtained by evaporating the tincture, 1 gramme of the product corresponding to 82.5 c.c. of the U.S.P. tincture or to 4.127 grammes of strophanthus seed. It proved to be very active;

and a similar extract, made of such a strength that 5 minims represent either $\frac{1}{4}$ or $\frac{1}{8}$ grain of the seed, is therefore recommended for official recognition. Commercial strophanthin was likewise found to be a very satisfactory and highly active preparation, the inclusion of which in the U.S.P., with appropriate tests for its purity, is also advocated by the authors.

Tincture of Strophanthus. J. Barclay. (*Pharm. Journ.*, 4th series, iii. 463; also *Chemist and Druggist*, 1896, 789.) The author calls attention to the great variation existing in the strength of different samples of this tincture, and to the desirability of standardizing this preparation. Some experiments undertaken by him with a view of arriving at a standard for the percentage of strophanthin did not give satisfactory results; and it was therefore decided to make an estimation of the strophanthidin produced by the hydrolytic decomposition of the impure strophanthin, taking advantage of the solubility of strophanthidin in chloroform. The following method was finally adopted for assaying the tincture:—

Fifty c.c. being taken, 50 c.c. of water was added, and the spirit removed by distillation. The filtered aqueous liquid after being shaken with chloroform was digested one hour on the water-bath with dilute sulphuric acid (this resulted in the production of a flocculent deposit of strophanthidin). After cooling, the turbid liquid was agitated with three successive small quantities of chloroform; the latter, after being separated, was removed by distillation, and the residual strophanthidin dried below 150° F. and weighed.

Table showing results of experiments made upon six samples of Tincture of Strophanthus.

	A.	B.	C.	D.	E.	F.	G.
Number of Sample.	Sp. gr. of Tr. at 15.5° C.	Extrac- tive.	Alcoholic extrac- tive yielded by seeds (calcu- lated from B).	Water soluble ex- tractive in tincture extractive (cal. on tr.).	Strophanthin obtained by treating aqueous ex- tractive with absolute alcohol.	Strophan- thidin.	Strophan- thidin calcu- lated from strophan- thidin.
1	.842	.674	13.4	.622	.417	.1498	.410
2	.8425	.73	14.6	.661	.412	.1538	.421
3 ¹	.842	.59	11.8	.5136	.470	.1134	.310
4	.8415	.52	10.4	.489	.472	.1508	.413
5	.842	.546	11.0	.512	.360	.109	.298
6	.843	.557	11.6	.519	.385	.1296	.355
Mean	.842	.60	12.13	.552	.42	.1314	.368

¹ Brown seeds.

Note on Infusum Cinchonæ Acidum. H. Bridges. (*Chemist and Druggist*, November 28th, 1896, 795, 796.) The factors determined by the author were—(1) the amount of dry extractive, and (2) the total alkaloids in 10 ozs. of infusion. Half-hour and one-hour infusions were prepared from Nos. 20, 40, and 60 powders, each infusion being filtered through paper, after thoroughly cooling, and thus obtaining in the cases of the No. 20 and No. 40 preparations perfectly bright filtrates. The powders used were specially sifted from one parcel of ground selected bark.

The following is a tabulated statement of the results:—

No. of Powder.	Time of Infusion.	Dry Extractive.	Total Alkaloids.
20	$\frac{1}{2}$ hour	47.5 grains	7.5 grains
20	$\frac{1}{2}$ "	49 "	8 "
40	$\frac{1}{2}$ "	37.5 "	5 "
40	$\frac{1}{2}$ "	41.25 "	5.5 "
60	$\frac{1}{2}$ "	56 "	7.5 "
60	1 "	60 "	7.5 "

The results show that the one-hour infusion from No. 20 powder was the most satisfactory preparation.

Note on Vinum Colchici. R. C. Cowley. (*Pharm. Journ.*, 4th series, iv. 173.) The author has made experiments with a view of ascertaining whether colchicum wine made from an acetic extract of the corm would be richer in alkaloid than that prepared by the B.P. method. His results, however, show that there is very little advantage gained in this way, and further, that a proof spirit menstruum extracts more alkaloid from the drug under otherwise equal conditions than acetic acid or cherry does.

Condurango Wine. M. Proskauer. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 30.) The author recommends the following recipe for this preparation:—Cort. Condurango 75 grammes, Cort. Aurant. 2.5 grammes, Cort. Cinnam. 2.5 grammes, Rad. Gentian. 1.5 gramme; macerate with 1.5 gramme of hydrochloric acid and $\frac{3}{4}$ litre of sherry wine for 8 days, then strain, add 60 grammes of simple syrup, and filter.

Glycerite of Liquorice. J. W. England. (*Amer. Journ. Pharm.*, December, 1896, 663-666.) The author considers that a satisfactory liquid liquorice preparation should contain, in the form of a clear solution, the entire quantity of soluble proximate

principles, and should be free from acrid resin or other undesirable products, besides being of a definite strength and possessing the full sweetness of the drug. He states that such a preparation can be obtained by the following process:—

Take of—

Powdered extract of liquorice	. 8 troy ounces.
Water . . . . .	. 32 fluid ounces.
Ammonia water . . . . .	. 1 fluid ounce.
Glycerine, a sufficient quantity.	

Sift the powdered extract upon the mixture of water and solution of ammonia, dissolve as far as possible, and pour the mixture upon a sand-bed contained in a large glass funnel. Allow to stand overnight, collecting the percolate. Then remove the gelatinised starchy mass that has collected on the surface of the sand-bed, add water, and continue to percolate through the sand until the soluble matter has been washed out. Mix the percolates, note the volume in fluid ounces, evaporate one fluid ounce on a water-bath to a constant weight, weigh, estimate the number of grains contained in the reserved percolates, and divide by 240 to obtain the number of fluid ounces of a 50 per cent. by volume solution that can be made. Then slowly evaporate the reserved percolates down to three-fourths of the estimated volume, and make up the full volume by adding the required quantity of glycerine. Should the product show the slightest turbidity, it may be cleared by the addition of a few drops of ammonia solution.

Cherry-Laurel Water. G. Cristofolletti, A. de Gironcoli, and A. Praxmarer. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 425.) The authors refer to preparations recently offered in commerce as *Aqua laurocerasi duplex* (containing 2 per cent. of H Cy) and *Aqua laurocerasi triplex* (containing 3 per cent. of H Cy). They point out that these are both artificial productions, and that any real (distilled) cherry-laurel water containing more than 1·5 per cent. of this acid is so unstable as to become turbid, and to deposit a sticky yellow substance after a very short time, in consequence of the decomposition of the hydrocyanic acid compound of benzaldehyde.

Preparation of Emulsions by means of Horse-Chestnuts. M. Durand. (*Journ. de Pharm.* [6], iii. 395.) Oil of cade, tar, heavy tar oils and similar substances, when required for liniments, may be advantageously emulsified by means of powdered

horse-chestnuts. For this purpose 5 parts of the powder are well mixed with a sufficient quantity of water to make 10 parts of liquid, and then vigorously shaken with 90 parts of the tar or oil. A perfectly uniform emulsion is thus obtained.

Saponin Emulsions. M. Schazki. (*Bull. Comm.*, xxiv. 272, from *Rev. Pharm. des Flandres*.) According to the author, saponin is preferable to gums, alkali, yolk of egg, or other substances used for pharmaceutical emulsions. The following are the formulæ recommended:—*Castor oil emulsion*: Castor oil, 30 grammes; saponin, 15 centigrammes; water, 150 grammes. *Cod-liver oil emulsion*: Cod-liver oil, 100 grammes; saponin, 20 centigrammes; water, 100 grammes; oil of peppermint, 2 drops. *Copaiba emulsion*: Balsam of copaiba, 5 grammes; saponin, 12 centigrammes; water, 95 grammes. *Creosote emulsion*: Creosote, 1.25 gramme; oil of sweet almonds, 10 grammes; saponin, 6 centigrammes; water, 100 grammes. *Iodoform emulsion*: Iodoform, 2 grammes; oil of sweet almonds, 8 grammes; saponin, 18 centigrammes; water, 100 grammes. *Chloroform emulsion*: Chloroform, 50 centigrammes; oil of sweet almonds, 15 grammes; saponin, 12 centigrammes; water, 100 grammes. *Camphor emulsion*: Camphor, 80 centigrammes; oil of sweet almonds, 15 grammes; saponin, 12 centigrammes; water, 100 grammes. *Santonin emulsion*: Santonin, *q.v.*; castor oil, 15 centigrammes; saponin, 12 centigrammes; water, 100 grammes. Employed thus, in this proportion, saponin is absolutely harmless.

Quinine Suppositories. D. Brunton. (*Brit. Med. Journ.*, 1896, 749.) To obviate the discomfort which often follows the ingestion of very large doses of quinine in malarial fever, the author advocates the exhibition of the remedy in the form of a suppository, from 10 to 20 grains being given in a single suppository, the dose being repeated every four or six hours; by this means the full antiperiodic effects of the drug are obtained, but all nausea, dyspepsia, giddiness, and other unpleasant symptoms avoided.

Note on Glycerinum Amyli. J. H. Pearson. (*Pharm. Journ.*, 4th series, iv. 201.) The author suggests the addition of a very small proportion of tragacanth to this preparation in order to prevent the separation to which it is otherwise liable on keeping. The use of 1 grain of this gum for every ounce of finished product was found a sufficient quantity for ensuring this result.

Linimentum Terebinthinæ. M. Schnabel. (*Pharm. Zeitung*, 1897, 183.) A turpentine liniment, which will remain uniform for several months, may be obtained from 40 parts of commercial soft soap, 5 parts of potassium carbonate, and 55 parts of oil of turpentine. Any addition of water or alcohol must be avoided.

Mercurial Ointment. P. Süss. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 712.) A short time ago, Laurenz recommended the application of ferric chloride for the rapid extinction of mercury in the preparation of mercurial ointment. The author condemns this process on the ground that it leads to the formation of an appreciable quantity of calomel, which in course of time is partly converted into corrosive sublimate.

Preparation of Mercurial Ointment. F. Michle. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 941, from *Apotheker Zeitung*.) For the preparation of this ointment the author effects the extinction of the mercury by means of 25 per cent. (of the weight of the mercury) of alapurin. After complete extinction, the resulting concentrated ointment is mixed with the remainder of the fat. He considers a mixture of 40 parts of solid paraffin with 10 parts of pure wool-fat and 50 parts of liquid paraffin as the most suitable fat basis for this ointment, owing to the absolute freedom of the product from any tendency to turn rancid.

Unsuitability of Vaseline and Lard as Ointment Bases for Cocaine. E. Sage. (*Pharm. Journ.*, 4th series, iii. 28.) The statement of text books that 1 part of cocaine is soluble in 20 parts of vaselin is shown to be erroneous. When a preparation containing these two substances in the proportion named is examined microscopically, it exhibits a mass of minute crystals interspersed with vaselin. An ointment made of the same strength with lard presents a similar appearance. It is therefore concluded that neither vaselin nor lard is a suitable solvent for the preparation of an ointment of cocaine, and that the idea of any superiority of such a preparation to one containing the hydrochlorate dissolved in a little water and rubbed up with fat is fallacious.

Solutions of cocaine in olive oil or castor oil appear to be perfectly stable.

Comparative Miscibility of various Ointment Bases with Water, Glycerine and Alcohol. A. St. Onge. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 712, from *Amer. Drugg.*) The following table

shows the proportions of water, alcohol and glycerine found by the author to be perfectly miscible with 100 parts of the various ointment bases named :—

Ointment base 100 parts.	Water.	Alcohol.	Glycerine.
Lard	15	9.05	100
Benzoated Lard . . .	17	8.36	100
90 parts of Lard + 10 parts of Vaseline . .	40	4	50
Cold Cream	50	5.68	300
Petrolatum	10	5.72	100
95 parts of Vaseline + 5 parts of Beeswax. .	40		
Lanolin	200	8.14	200

NOTES AND FORMULÆ.

PART III.

NOTES AND FORMULÆ.

Tuberculin. R. Koch. (*Deutsch. Med. Wochenschr.*, 1897, No. 14. From *Pharm. Journ.*) The author gives an account of some further recent investigations relating to tuberculin, from which he considers important results have been obtained. He attributes the failure of tuberculin as a remedy to the circumstance that although it produced a reaction against the toxin generated by the tubercle bacillus, and thus rendered the organism immune in regard to that toxin, it did not produce immunity against the bacillus itself. In his opinion, the glycerine extract does not contain all the chemical constituents of the bacillus, but only those which confer immunity against the toxin. Hence he has endeavoured to obtain the substance capable of producing immunity against the bacteria. On the basis of observations on the influence of a preparation obtained by extracting the bacilli with weak soda liquor and containing dead bacilli, he has been led to try the effect of a mechanical disintegration, and by that means has produced a preparation distinguished as TR, which he believes will give immunity against the tubercle bacillus as well as against the toxin it generates. This preparation is now being produced at the Höchst colour works (Meister, Lucius and Brüning). Clinical trials in cases of lupus are stated to have given very satisfactory results, and in cases of tuberculosis treatment with the new preparation has had the effect of stopping expectoration and improving the condition of the lungs without causing any objectionable symptoms or detriment to health; but these results are described with much reserve, and it remains yet to be decided whether or to what extent an important advance has been made.

Oxytuberculin and Oxysepsin. J. O. Hirschfelder. (*Deutsch. Med. Wochenschr.*, 1897, 19.) The name *oxytuberculin* is applied by the author to a tuberculin altered by oxidation, which he believes to be capable of curing local and general tuberculosis. This sub-

stance is not prepared from Koch's tuberculin, but from a preparation obtained by himself from bacilli developed to a very high state of virulence. The culture medium consists of veal broth with 4 per cent. of glycerine, 1 per cent. of Witte's peptone, $\frac{1}{2}$ per cent. of sodium chloride, and $\frac{3}{10}$ per cent. of normal sodium carbonate. After complete development of the bacillus the mixture is sterilised for an hour and filtered. The filtrate is mixed with $\frac{1}{8}$ of its volume of a 1:10 solution of hydrogen peroxide, and subjected to prolonged sterilisation in a flask plugged with cotton wool. The same quantity of hydrogen peroxide is again added after every twelve hours until this treatment has proceeded for 96 hours; after this any free hydrogen peroxide still present is eliminated, and the preparation is then ready for use.

The advantage of oxytuberculin over other tuberculin-preparations is stated to consist in the fact that it can be administered in very large doses (20 c.c. daily) without causing the slightest trouble or unpleasant effects. The author was led to undertake this investigation by the consideration that the conversion of toxins into antitoxins in the organism would be the result of oxidation processes.

Oxysepsin.—In advanced cases of tuberculosis there is an infection with various cocci and bacilli causing the hectic fever and rapid destruction of tissue. In such cases the author has employed, in addition to oxytuberculin, another oxytoxin to which he applies the name "oxysepsin." It is prepared from a culture of the sputum of a tuberculous patient already suffering from high hectic fever, by a process exactly analogous to that by which oxytuberculin was obtained. The author states that enormous quantities of this preparation as well as of oxytuberculin (as much as would correspond to 2.5 grammes of ordinary tuberculin) can be injected without causing the slightest rise of temperature or ill effect of any kind.

Pneumobacillin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 161.) This preparation is stated to be a product of metabolic change of the toxin causing pleuro-pneumonia in cattle. It is offered as a diagnostic remedy, which is stated to have given very satisfactory results.

Marmorekin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 713.) *Marmorekin* is merely a new term for the serum introduced by Marmorek, of Paris.

Testin and Testidin. E. Stroschein. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 687.) *Testin* is the name of a preparation

obtained by the author from bullock's testicles by hydraulic pressure. It is administered in the form of tablets of 0.4 gramme.

Testidin is another therapeutic agent obtained from testin by extraction with alcohol. It is a dark brown, somewhat sticky extract.

Iodothyryn. F. Bayer & Co. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 686.) *Iodothyryn* is the new name now adopted in the place of "thyroidin" for the active principle extracted from the thyroid gland according to the process described by Baumann (*Year-Book of Pharmacy*, 1896, 70, 71). The object of this change in name is to avoid confusion with other preparations bearing names similar to that previously adopted.

Iodothyroidin. M. Catillon. (*Nouv. Rem.*, xiii. 129. From *Pharm. Journ.*) Commenting on the confusion that has arisen in the nomenclature of thyroid preparations, through the use of various and more or less misleading trade names, the author, in a communication to the Société de Thérapeutique, describes a method of preparing the active portion of thyroid for medicinal use in the form of a standardised product, which he calls iodothyroidin. It is prepared as follows:—The glands are submitted to pancreatic digestion with pancreatin and water; the residue is extracted with petroleum ether, dissolved in dilute soda solution and filtered, the filtrate slightly acidulated with dilute sulphuric acid, when the active principle is precipitated. This is collected and washed, the amount of iodine in a portion determined, and sufficient sugar of milk added to the bulk to reduce the iodine content to 0.0003 gramme in each gramme of finished product.

Aiodin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 791, 792.) Aiodin is the trade name given by Hoffmann and Traube, of Basle, to a thyroid preparation stated to consist of the active principle of the gland in the same state of combination with proteids in which it exists in the gland itself. It is free from additions and from decomposition products, and is described as a light, odourless and tasteless powder, insoluble in water, containing 0.4 per cent. of iodine, and representing the activity of ten times its weight of the fresh gland.

Aiodin, when shaken with water, produces a pink coloration on the addition of one or two drops of solution of potassium hydrate. It gelatinises on boiling with acetic acid, and when boiled with strong mineral acids it is decomposed and dissolved. On complete incineration it leaves 55 per cent. of ash. When aiodin is fused with saltpetre and soda and the fused mass dissolved in water, a

solution is obtained which turns yellow on the addition of nitric acid containing nitrous acid, and then yields an intense iodine reaction with chloroform. The quantitative estimation of the iodine may be carried out on the same lines.

Ovarium Siccum. E. Merck. (*Pharm. Journ.*, 4th series, iii. 246.) This preparation consists of the substance of cow's ovaries, freed from fat and dried. Numerous trials have shown that the administration of ovarian substance has a beneficial effect in neurotic affections incident to the menopause, and that it is unattended with any prejudicial action. The dose is about 10 to 20 grains three times a day.

Ovadin and Supradin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 116.) The name "ovadin" is applied by Hoffmann and Laroche to a dry extract containing iodine, obtained by them from the ovaries of heifers and pigs.

"Supradin" is a similar preparation (also containing iodine) obtained from the kidneys.

Myelen. R. Schultze. (*Pharm. Zeitung*, 1896, 819.) This name is given by the author to a fluid-extract prepared by him from bone marrow. It is a reddish, syrupy liquid, and is suggested for the treatment of anæmia, scrophulosis, and particularly of rickets and general debility, or wasting of the bones.

Fluid Extract of Sheep's Lungs. M. Brunet. (*Münch. Med. Wochenschr.*, and *Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 116.) Under the name *Extractum fluidum pulmonum ovis*, or "Lung Juice," a preparation has been introduced by the author which consists of a sterilized extract from the lungs of healthy young sheep. It is a yellowish-red clear liquid of a slightly sweet taste, which is employed both internally and subcutaneously; in the former case in daily quantities up to 5 grammes, and in the latter case in quantities up to 10 c.c. per day.

Iodosin and Bromosin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 894.) These preparations are obtained by the action of iodine or bromine on albumin, and are stated to contain 15 per cent. of iodine and 10 per cent. of bromine respectively.

Benzochlorhydroiodhydrin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 355, from *Apoth. Zeitung*.) This preparation is an organic iodine compound introduced by Chenal as a substitute for potassium iodide, over which it has the advantage of not producing symptoms of iodism, while in all other respects it possesses the therapeutic properties of the potassium salt. It is obtained by the action of epichlorhydrin on benzoyl iodide at a temperature not

exceeding 70° C. The resulting product is a brownish crystalline substance, soluble in ether, alcohol, or petroleum, but not in glycerine. It is given in doses of 0.13 gramme. This preparation is also likely to possess antiseptic properties.

Caffeine Iodol. (*Pharm. Zeitung*, xli. 497.) This preparation is introduced as a substitute for iodoform, and likewise as an internal remedy in the place of ordinary iodides. It is the product of the reaction of equivalent quantities of caffeine and iodol in alcoholic solution, and is described as a pale grey, odourless and tasteless powder, almost insoluble in ordinary solvents.

Anozol. P. Diaz. (*Zeitschr. des oesterr. Apoth. Ver.*) This preparation, which is also termed "deodorized iodoform," is obtained by mixing 0.1 to 0.2 gramme (according to the strength desired) of powdered thymol with 1 gramme of iodoform. The odour of the preparation is purely that of thymol.

Salubrol. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 29.) This preparation is offered as a substitute for iodoform, and is obtained by the action of bromine on methylenedianthipyrine. It is an almost odourless powder, the antiseptic action of which is due to the fact that it is decomposed with liberation of bromine, when brought in contact with organic tissues. Experiments on animals have shown it to be perfectly free from toxic properties. It does not merely check the development of bacteria, but destroys cultures already well developed. Its desiccating action on wounds is stated to be very remarkable. It is applied as a dusting powder, and in the form of a 20 per cent. gauze.

Condensation Products of Tannins with Formaldehyde. C. E. Merck. (*Chem. Centr.*, 1896, 560.) The author has previously introduced a condensation product of nut-gall tannin with formaldehyde under the name of "tannoform" (*Year-Book of Pharmacy*, 1896, 181). By withdrawing the tannins from various astringent plant extracts by treatment with formaldehyde in the presence of hydrochloric acid, he has now prepared a number of analogous compounds, of which *quercitannoform*, *quebrachitannoform*, *rhatany tannoform*, and *myrobalans tannoform* are described in the present paper. For further particulars, reference should be made to the source given above.

Further Observations on Tannigen. M. Escherich. (*Rev. de Thérap. Med. Chirurg.*, lxiii. 218.) Compare *Year-Book of Pharmacy*, 1895, 207. Further experiments with this remedy confirm the favourable results previously obtained with it by others in the treatment of infantile diarrhoea. Its combined astringent and

antiseptic properties appear to render it particularly valuable in chronic or sub-acute enteritis of the large intestine.

Condensation Product of Morphine and Formaldehyde. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 95.) Meister, Lucius, and Brüning describe a condensation product obtained on warming an acid solution of morphine with formaldehyde. The preparation is amorphous, melts at 207°C ., and is difficultly soluble in water, but easily soluble in alcohol and alkalies. The hydrochloride is very readily soluble in alcohol.

Peronine. L. J. Schroeder. (*Therap. Monatsh.*, January, 1897.) A preparation introduced under this name by E. Merck is the hydrochloride of the benzyl-ether of morphine, in which the hydrogen atom of the hydroxyl group of morphine is replaced by the alcohol-radical $\text{C}_6\text{H}_5\text{CH}_2$. The author has investigated its merits in the treatment of the cough of phthisical patients, and has obtained very satisfactory results. It appears to have a soothing effect on the irritated mucous membrane, and to promote sleep. The dose is 0.02–0.04 gramme dissolved in water.

Dicodcylmethane. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 52.) This name is given to a condensation product of codeine and formaldehyde, which is prepared by digesting an acid solution of codeine with formaldehyde, precipitating the resulting blue fluorescent solution with soda, and washing the precipitate thus produced. The reaction consists in the combination of 2 molecules of codeine with 1 of formaldehyde with elimination of water.

Dicodcylmethane hydrochloride melts at 140°C ., and is soluble in water and alcohol. It is intended for therapeutic purposes, but no particulars are given respecting its use.

Nortropinone. R. Willstätter. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 29.) The author applies this name to a compound of the formula $\text{C}_7\text{H}_{11}\text{NO}$, which he has obtained from "tropigenin" (an oxidation-product of tropine) by further slow oxidation with a solution of chromic acid in glacial acetic acid at 55 to 65°C . Nortropinone is a ketone which melts at 69 – 70°C ., and rapidly absorbs carbonic acid and moisture from the air. Its salts and some of its alkyl—and acetyl—derivatives are intended for pharmaceutical (therapeutic?) purposes.

Mydrol. (*Pharm. Centr.*, xxxvii. 718.) Mydrol is a preparation obtained from iodomethylphenylpyrazolon, and forms a white, odourless, bitter-tasting powder, readily soluble in water, but insoluble in ether and alcohol. It possesses mydriatic properties, and is recommended as a substitute for atropine. Internally ad-

ministered, it has also a retarding action on the circulation. It is stated to be non-poisonous.

Homoarecoline. (*Merck's Bericht* for 1896.) *Homoarecolinum purum*, $C_7H_{10}(C_2H_5)NO_2$, the ethyl ether of arecaidine, a derivative of arecoline, forms a pale yellow liquid soluble in water, alcohol, and ether.

Homoarecolinum bromatum, $C_9H_{15}NO_2 \cdot HBr$, forms colourless crystals which melt at $118-119^\circ C.$, and are soluble in water and alcohol.

The pharmacological investigation of these two preparations is proceeding.

Chrysotoxin. (*Pharm. Zeitung*, xlii. 79.) This name is applied by Jacoby to a substance isolated by him from ergot, and is stated to possess considerable stability. It is introduced both in its pure form and as a sodium compound, *chrysotoxin-sodium*.

Oxycamphor. R. Heinz. (*Pharm. Zeitung*, xli. 696.) This preparation was first obtained by Manasse in the oxidation of camphor, and stated to have a composition corresponding to the formula $C_8H_{14} \begin{matrix} \swarrow CHO H. \\ \searrow C O. \end{matrix}$ It is now recommended by the author

as a useful therapeutic agent in all kinds of asthma, and also in excited conditions of the nervous system.

Apiolin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 94.) Apiolin is prepared from crude oil of parsley by saponification and subsequent distillation. It is a pale yellow, neutral liquid soluble in alcohol, having a specific gravity of 1.135, and boiling between $280-300^\circ C$.

This preparation is used in France in menostatic troubles to restore regularity in the menses. Owing to its pungent taste and smell it is best administered in gelatin capsules, each containing 0.2 gramme. Two to three such capsules are given daily for two or three consecutive days at the time required.

Cupressin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 95.) Cupressin is the name given to the essential oil of *Cupressus sempervirens*, which is used for inhalations and fumigation in whooping cough.

Oil of Amber in Whooping Cough. (*Chemist and Druggist*, 1896, 311.) Murrell recommends oil of amber, both internally and externally, in the treatment of whooping cough. For internal administration it may be given in doses of 3 to 10 drops every four hours on a piece of sugar, or preferably in the following mixture:—

Oil of Amber	℥x.
Powdered Gum Acacia	5j.
Syrup of Orange-flower	3ij.
Oil of Anise	℥iij.
Water to	3j.

M.

For a liniment the following formula is suggested:—

Oil of Amber	3ʒj.
Oil of Rosemary	3j.
Oil of Origanum	3j.
Oil of Turpentine	3j.
Linseed Oil to	3iv.

This liniment is applied vigorously along the course of the spine night and morning.

Manol. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 599.) This name is applied by O. Ringk and Stelzer to a "*Succus anisi ozonisatus*," a speciality alleged to consist of an ozonised extract of anise and star anise, and recommended as a remedy for whooping cough.

Enema of Quinine in Whooping Cough. (*Münch. Med. Wochenschr.*, xliii. 859; *Pharm. Journ.*, 4th series, iv. 58.) As a substitute for sublimate painting in whooping cough, Schulze recommends the use of an enema of quinine bisulphate in distilled water, the dose being 1 centigramme for every month, and 1 decigramme for every year of the patient's age, the limit of 50 centigrammes not being exceeded even in the case of older children. A clyster of this strength is given three times daily.

Sambucium. G. Lemoine. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 600.) The preparation introduced under this name by the author is an alcoholic fluid extract of the bark of *Sambucus nigra*, of which one ounce represents one ounce of the bark. It is strongly recommended as a diuretic.

Citrurea. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 917.) A preparation consisting of urea, citric acid and lithium bromide, and introduced as a diuretic and solvent of uric acid.

Urisolvin. J. Mahl. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 573.) The preparation introduced under this name is stated to be a combination of pure urea and acid citrate of lithium, and to combine diuretic effects with a solvent action on uric acid and urates. It is given in doses of 0·2 gramme every three hours in gout, gravel, calculus, and uric acid diathesis in general.

Saliformine. E. Merck. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 819.) The name saliformine is applied by the author to salicylate of formine (hexamethylenetetramine), which, like the base itself, has a solvent action on uric acid.

Glycocholate and Taurocholate of Sodium. (*Merck's Bericht* for 1896.) *Sodium glycocholate*, $C_{26}H_{43}NO_6Na$, is a white powder soluble in water.

Sodium taurocholate, $C_{26}H_{44}NO_7SNa$, forms white needles or a white crystalline powder, soluble in water.

According to Stadelmann both these salts are reliable and efficient cholagogues. They do not in the slightest degree impair digestion, even in doses of 5 to 10 grammes per day, while the increase in the elimination of bile is very considerable indeed. The glycocholate is regarded as the more suitable of the two salts for therapeutic purposes, and is best administered in the form of pills coated with keratin.

Eunatrol. F. Blum. (*Pharm. Zeitung*, and *Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 144.) This name is applied to pure sodium oleate, which is strongly recommended as a cholagogue. It is given in doses of 1 gramme twice a day in the form of chocolate-coated pills, each of which contains 0.25 of the oleate. The treatment may be continued for any length of time without causing any unpleasant effect or the slightest disturbance of the general health.

Vanillin-p-Phenetidin. C. Goldschmidt. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 381.) This preparation is obtained by heating vanillin with *p*-phenetidin to about $140^{\circ}C$., and crystallising the condensation product from hot water. It melts at $97^{\circ}C$., is slightly toxic, and differs from the hitherto known compounds of *p*-phenetidin with aldehydes by its solubility in water, and by its possessing hypnotic as well as antineuralgic properties.

Phenetidin-Citric Acid. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 600.) A process patented by F. v. Heyden and consisting mainly in the heating of *p*-amidophenetol with citric acid, yields either mono- or diphenetidin-citric acid according to the relative proportions used.

Monophenetidin-citric acid forms a white crystalline powder or large colourless crystals melting at $72^{\circ}C$. It is readily soluble in hot water, has a pleasant taste and an acid reaction, and dissolves in solutions of alkaline carbonates with effervescence. When desiccated over sulphuric acid, or on heating to $100^{\circ}C$., it parts

with a molecule of water and is converted into a substance melting at 129°.

Diphenetidin-citric acid is a white powder, having an acid reaction and melting at 179° C. It is difficultly soluble in water and more readily soluble in alcohol or hot soda solution.

Both acids are therapeutic agents possessing antipyretic and analgetic properties, and are regarded as preferable to the hitherto known acid derivatives of *p*-amidophenetol (phenacetin and lactophenin) on account of their greater solubility and quicker action. They are also stated to exercise a mild stimulating effect on the heart.

Anisidin-Citric Acid. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 792.) This preparation, introduced by F. v. Heyden, is stated to be superior as an analgetic to phenetidin-citric acid (preceding abstract), with which it otherwise agrees in its properties.

Malarin. (*Pharm. Zeitung*, xli. 598.) Malarin, a new antipyretic, is the citrate of a condensation product of acetophenone and parphenetidin, and crystallises in yellow needles, which melt at 88° C., and are soluble in hot alcohol, ether, and glacial acetic acid, but insoluble in cold water. It is stated to act as a very efficient and reliable antipyretic, and also as an anodyne, and is given in doses of 0.5 gramme. Special stress is laid upon its absolute freedom from injurious effects, even when given in very large doses. The urine eliminated after its administration gives no indication of either sugar or acetone.

Kryofin. (*Deutsch. Med. Wochenschr.*, 1897, 257.) This new antipyretic is, like phenacetin, a *p*-phenetidin derivative, viz., a condensation product of phenetidin and methylglycolic acid, resulting from the action of these bodies upon each other at 120-130° C. It crystallises from water in white, odourless and almost tasteless needles, which melt at 88-89° C., and are soluble in 52 parts of boiling and in 600 parts of cold water. It is given in the form of powder enclosed in wafers in doses of 0.5 gramme, which quantity is found equal in its antipyretic action to 1 gramme of phenacetin. It is also recommended as an antineuralgic remedy.

Phenylchinoldine in Malarial Fever. (*Bulletin Comm.*, xxiv. 273.) Phenylchinoldine, $C_3H_5(C_6H_5N)$, is brought forward as a remedy for malarial fever. It is given in doses of 10 to 20 centigrammes, and is obtained by the action of hydrochloric acid on a mixture of aniline acetophenone and aldehyde. The hydrochloride of the base occurs in colourless, readily soluble crystals.

New Quinine Compounds. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 94, 160.)

Quinine glycerophosphate, $C_3H_7O_3 \cdot P O_3 (C_{20}H_{24}N_2O_2)_2$.—This preparation forms colourless needle-shaped crystals, which are readily soluble in hot water and alcohol, and contain 68 per cent. of quinine. It is employed in malaria, neuralgia, and during convalescence after fevers. 3 grammes are mixed with 1·5 gramme of milk-sugar, and made into thirty pills with the aid of syrup. Dose: 1 to 3 pills three times a day.

Quinine ido-hydriodide, $C_{20}H_{24}N_2O_2 \cdot I \cdot H I$.—A brown powder insoluble in water and soluble in alcohol. Employed in secondary and tertiary syphilis in daily doses of 2·5 grammes, usually in the form of pills made up with kaolin and mucilage.

Chlorocarbonyl-quinine is a derivative of quinine which is formed by the action of phosgen either in the gaseous form or in solution on anhydrous quinine at a low temperature. It is perfectly free from bitter taste, and is soluble in gastric juice. From its alcoholic solution it is obtained in crystals melting at 187–188° C. It is a weaker base than quinine, but combines with mineral acids to form salts. A solution in dilute sulphuric acid shows a blue fluorescence.

Quinine Hydrochloro-Phosphate. Z. Jodkiewicz. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 4, from *Gazeta lekarska*.) This preparation, which is stated to have the composition $C_{20}H_{24}N_2O_2 \cdot H Cl \cdot 2 P O_4 H_3 \cdot 3 H_2 O$, and to contain 32% of phosphoric acid and upwards of 50% of quinine, is reported to have proved very serviceable in several obstinate cases of malaria, as well as in nervous headaches. It is obtained by dissolving 35 grammes of quinine hydrochloride in a warm mixture of 70 grammes of pure concentrated phosphoric acid of 1·154 sp. gr. and 9 grammes of dilute hydrochloric acid, and allowing the solution to crystallise. The crystals contain 8·79% of water, and are soluble in twice their weight of water.

Euquinine (Euchinin). (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 917.) The Frankfort quinine works have introduced a preparation under this name, consisting of the ethylcarbonic ester of quinine. It is produced in the action of ethylchlorocarbonate on quinine, and forms white delicate needles, which are readily soluble in alcohol, ether, or chloroform, but difficultly soluble in water. The notable feature of this preparation is its almost complete tastelessness. The tannate of this compound is also tasteless, but the hydrochloride has a distinct unpleasant taste.

Euquinine is given in doses of 1 to 2 grammes, in sherry, milk or cocoa. It has been very successfully used in whooping cough, phthisical feverishness, sepsis, and typhoid. As a rule, one gramme doses are given twice a day.

An Efficient Antipyretic. M. Berger and E. Vogt. (*Zeitschr. des. oesterr. Apoth. Ver.*, xxxiv. 734, from *Therap. Monatsh.*) The authors recommend a mixture of 2.5 grammes of antipyrine, 1.0 gramme of phenacetin and 0.5 of antifebrin as an excellent antipyretic. The total quantity here given is to be divided into eight powders, of which two to four may be administered daily.

Oxyphenacetin Salicylate. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 843.) This antipyretic is stated to be free from the objectionable effects of either of its constituents. It crystallises in shining silky laminae melting at 132 to 134° C., and is obtained by heating either chloro- or bromo-phenacetin with sodium salicylate.

Cordol. (From *Gehe's Bericht.*) The name cordol is given to tribromosalol, which is recommended as a sedative, antirheumatic and antineuralgic. It is a crystalline powder, insoluble in water, difficultly soluble in alcohol and ether, and melting at 195° C. It is given in doses of 0.5 to 1.5 gramme, which may be repeated 3 or 4 times daily.

Two derivatives of cordol, viz., *cordyl* (an acetyl compound), and *cordeïn* (a methyl compound), are being investigated with regard to their clinical merits.

Pyramidone. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 917.) Pyramidone is dimethylamidophenyl-dimethylpyrazolon, a new derivative of antipyrine prepared by Filehne and Spiro. It forms a tasteless, yellowish-white, crystalline powder, which is soluble in ten times its weight of water. Its solution is coloured bluish-violet by ferric chloride, and violet by fuming nitric acid, but these colorations soon disappear.

The physiological effects of this preparation are analogous to antipyrine, but the dose is somewhat smaller (0.2 to 0.5 gramme for adults); its action, though somewhat slower, is more lasting than that of antipyrine.

Cosaprin. P. Schwarz. (*Pharm. Zeitung*, and *Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 144.) This new antipyretic is an acetyl compound of sodium sulphanilate represented by the formula $C_6H_4 \begin{matrix} \diagup NH(CO.CH_3) \\ \diagdown SO_3Na \end{matrix}$. It is a non-poisonous, white, crystalline substance, readily soluble in water, more difficultly so in alcohol, and insoluble in ether.

Benzaceticin, an Anti-Neuralgic and Anodyne. (*Pharm. Zeitung*, xlii. 107.) Benzaceticin (phenacetincarbonic acid or acetamido-salicylic acid), and its lithium salt (*lithium-benzaceticin*), are stated to exercise a prompt anti-neuralgic action, and to be useful in 0·5–1·0 gramme doses in insomnia and nervous excitability. Benzaceticin crystallises in needles, which melt at 205° C., are readily soluble in alcohol, and difficultly soluble in water, and form salts with metallic bases.

Acetocaustin, Arthriticin, and Antiarthrin. (*Pharm. Zeitung*, 1896, 873, and *Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 233.) *Acetocaustin* is stated to be a 5 per cent. solution of trichloroacetic acid.

Arthriticin.—This preparation, which is used both as a therapeutic agent and as a disinfectant, is reported to be the nitrile of the ethylcresol of amidoacetic acid and of diethylene-imine.

Antiarthrin.—This preparation, introduced as a remedy for gout and rheumatism, is a reddish-brown powder, having a bitter taste and a slight empyreumatic odour, and is represented to consist of salicin and its hydrolytic products (saligenin and dextrose), and also to contain some free hydrochloric acid and a vegetable extract (according to Thoms, chestnut extract). It is recommended to be given in the form of pills made according to the following formula:—Antiarthrin 7·5 grammes, powdered rhubarb 2·5 grammes, powdered marsh-mallow root, tragacanth, and glycerine, of each sufficient to make 50 pills.

Aseptolin. (*Amer. Journ. Pharm.*, July, 1896, 402.) The preparation introduced under this name by C. Edson as a remedy for the treatment of tuberculosis, septicæmia, malaria, and influenza, is stated by Lengfeld to be a solution of a compound of pilocarpine and phenol.

Influenzin. E. Schniewind. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 713.) The preparation called by this name is stated to consist principally of caffeine, phenacetin, quinine, salicylic acid, and sodium chloride. It is given in influenza, migraine, etc.

Ammonol. G. M. Beringer. (*Amer. Journ. Pharm.*, March, 1897, 150–152.) This preparation, which was introduced as a product of the amidobenzol series by an American company, has been examined by the author, and found to be a mere mixture of 10 parts of acetanilid, 5 parts of sodium bicarbonate, 5 parts of ammonium carbonate, and 0·005 part of aniline yellow.

Eosote (Creosote Valerianate). E. Grawitz. (*Therap. Monatsh.*, 1896, No. 7.) This substance, first prepared by G. Wendt, is

stated to be a valerianic ester of creosote, and has been administered by the author with good success in cases of phthisis and gastero-enteritis. It is given in gelatin capsules containing 0.2 gramme each, three to nine such capsules being administered daily. It is described as an odourless and tasteless, very mobile liquid free from corrosive and toxic properties.

Geosote (Guaiacol Valerianate). (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 573.) This preparation is stated to be a valerianic ester of guaiacol, and is used in the place of guaiacol carbonate in the treatment of pulmonary tuberculosis.

Phenol-Creosote. M. Vêret. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 945.) This is a mixture of 3 parts of creosote, 1 part of carbolic acid, and 1 part of alcohol. The author employs a mixture of 1 part of this preparation with 10 parts of glycerine, 40 parts of alcohol, and 50 parts of water, for inhalation in pneumonia.

Creoso-Magnesol. MM. Romeyer and Testevin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 867.) This compound of creosote and magnesia is stated by the authors to be preferable to creosote for medicinal use on account of its much less objectionable taste and the greater ease with which it is borne by the stomach. It is prepared by emulsifying a solution of 20 grammes of caustic potash in 10 grammes of water with 800 grammes of creosote, and then incorporating 170 grammes of calcined magnesia with the emulsion. The mixture soon turns harder and darker in colour, and finally becomes pulverizable. It contains 80 per cent. of creosote, and is best administered in the form of pills made with honey.

Creosolid. (*Therap. Monatshefte*, 1897, 292.) This preparation, introduced by Denzel, is a magnesium compound of the bivalent phenols of creosote, and forms a white powder, of which 1 gramme corresponds to 2 grammes of creosote. It has only a slight odour and taste, and is given in doses of 0.5 gramme four times a day. Under the influence of the gastric juice it is decomposed, guaiacol and creosote being liberated in a state of minute division. The preparation is stated to have no caustic action, and to be well tolerated by the stomach.

Tannosol. E. Feigl. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 868.) The author has applied this name to a tannic acid ester of creosote. It is an amorphous, brown, very hygroscopic powder, easily soluble in water, alcohol, or glycerine. It is stated to possess the combined therapeutic properties of tannin and creosote, and to have the advantage of being free from the burning taste

and caustic properties of the latter. In the intestines it is decomposed into creosote and tannic acid.

Characters and Tests of Guaiacetin. M. Homeyer. (*Apoth. Zeitung*, 1897, No. 22.) The author publishes the following characters and tests for the identification and purity of this preparation, which was introduced some time ago as a substitute for creosote in the treatment of phthisis (*Year-Book of Pharmacy*, 1896, 181).

Guaiacetin is a white, odourless, and almost tasteless powder, appearing under the microscope as an agglomeration of fragments of prismatic crystals. A solution of 5 grammes in 15 grammes of water should be clear and neutral; on adding sufficient dilute sulphuric acid to this solution to effect complete precipitation, and extracting the precipitated acid by means of ether, the ethereal solution after repeated washing with water and subsequent evaporation should yield pure guaiacetic acid (pyrocactechinacetic acid), which, after careful desiccation, should melt at 130–131° C. On heating this acid for some time at 140–150° C., water is eliminated and the lactone of the acid formed, which melts at 56° C. The determination of the melting points of guaiacetic acid and its lactone afford sufficient data for the recognition and for the purity of guaiacetin (the sodium salt of the acid named). The aqueous solution of guaiacetin assumes a deep blue colour on the addition of ferric chloride.

Duotal. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 818.) This is merely a new name for guaiacol carbonate.

Ethylenated Guaiacol. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 793.) This preparation forms yellowish white, odourless crystals of the formula $C_2H_4(C_6H_4O.CH_3O)_2$, which melt at 138–139° C., and are soluble in hot alcohol but difficultly soluble in water. According to Oefele, it is administered in phthisis in doses of 0·5 to 1 gramme twice daily, and possesses an advantage over guaiacol carbonate in being more readily borne by the patient.

Phospho-Guaiacol. M. Ballard. (*Rep. de Pharm.*, 1897, 105.) *Phospho-guaiacol*, or guaiacol phosphite, is a compound obtained by the action of phosphorus trichloride on an alkaline alcoholic solution of crystallised guaiacol. The product, after re-crystallisation from absolute alcohol, has the composition $P.(C_6H_4:OCH_3O)$, showing it to be the neutral phosphite of guaiacol. It is a white crystalline powder melting at 77·5° C., and having a very slight odour and burning taste. It is soluble in water, alcohol, ether, chloroform, acetone, benzol, toluol, and fatty oils; its aqueous

solution turns red with ferric chloride. It is free from caustic action, and is readily tolerated in doses of 6-8 grammes.

Phosphatol. M. Ballard. (*Rep. de Pharm.*, 1897, 105.) This preparation consists of the phosphorous esters of the various phenols present in creosote, and is obtained from creosote in the same manner in which phospho-guaiacol is obtained from guaiacol (preceding abstract). It forms a thick brownish-red liquid boiling at about 140° C., and showing the same behaviour to solvents and towards ferric chloride as phospho-guaiacol.

Analogous products are also formed by the action of phosphorus trichloride on alkaline alcoholic solutions of cresol and paracresol; but the author did not succeed in isolating the phosphorous esters thus produced.

Guaiacol Phosphate. (*Merck's Bericht* for 1896.) Guaiacol phosphate (*Guaiacolum phosphoricum*) is a white crystalline powder, soluble in alcohol, chloroform, or acetone, and melting at about 98° C. This preparation is used in the same cases and the same doses as guaiacol.

Guaethol. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 819.) This preparation, introduced by E. Merck, is pyrocatechin-ethyl-ether. It is stated to possess the physiological properties of guaiacol, and according to J. v. Mering it is markedly superior to the latter in its action.

A product identical with guaethol is reported upon under the name *ajacol* by Heyden, and under that of *thanatol* by Karlovsky (*ibid.*, 867).

Phenamine and Triphenamine. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 258.) *Phenamine* is a name applied by Lindhorst to pure phenocoll.

Triphenamine.—The preparation introduced under this name is shown by Langkopf to be a mixture of 2.6 parts of pure phenocoll, 1.0 part of phenocoll salicylate, and 0.4 part of phenocoll acetate.

Antibacterin. V. Wachter. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 792.) This is a new germicidal remedy recommended for the treatment of pulmonary tuberculosis. It is described as a pale greenish-yellow, non-poisonous liquid consisting of a combination of an ethyl compound of orthoboric acid with iron. The vapour of this liquid is inhaled, at first ten times daily, the number of daily inhalations being gradually increased up to 120. Professional experience as to the value of this remedy is still wanting.

Chinaphthol (Quinaphthol). E. Merck. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 894.) A compound of quinine and naphthol has been introduced by the author under this name, and is described as a yellow, crystalline, bitter-tasting powder, which is slightly soluble in hot water and alcohol, but insoluble in cold water. It is stated to be indicated in typhoid fever, tuberculosis of the bowels, dysentery, acute articular rheumatism, and generally in all cases in which the chief object to be obtained consists in the destruction of microbes. It is given in doses of 0·5 to 5 grammes daily. In the intestines it is split up into its components.

Quinidine, cinchonine, and cinchonidine form similar compounds with naphthol.

Naphthosalicin. L. Cuntz. (*Rev. Méd. Pharm.*, iv. 77, and *Südd. Apoth. Zeitung*.) This name is applied by the author to an antiseptic product intended for use in laundries. It is obtained by dissolving naphthol and salicylic acid in a hot solution of borax. Solution of ammonia may be used as a solvent in place of the borax. These solutions, even when very largely diluted with cold water, keep unchanged for any length of time, and are stated to be very serviceable for the disinfection of clothes in laundries, hospitals and barracks.

Naphthoresorcin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 599, 600.) This substance is prepared by F. Bayer & Co. by a patented process, according to which dioxynaphthalinsulphonic acid is heated with dilute mineral acids. Naphthoresorcin is thus formed by elimination of the sulpho-groups and the replacement of the amido- by the hydroxyl group.

The product is soluble in water and crystallizes in conglomerations of laminæ or plates, melting at 124° C. It is intended for pharmaceutical and also for dyeing purposes; but no particulars are given.

Traumatol. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 145 and 180, from *Pharm. Zeitung*.) Traumatol, also called *iodocresin*, has been introduced by Chevrier and Kraus, and is recommended by W. Schattenmann as an antiseptic. It is stated to be an iodine compound of cresylic acid, in the form of a red, amorphous, odourless, very light powder, containing 54·4 per cent. of iodine, present in the benzol nucleus. The preparation is insoluble in water and dilute acids, and is decomposed by concentrated nitric or sulphuric acid with elimination of iodine. It is almost insoluble in alcohol, slightly soluble in ether, and readily so in chloroform, carbon

bisulphide, or strong alkalis. From its alkaline solution it is reprecipitated by dilute acids.

Iodanisol (Orthoiodanisol). (*Merck's Bericht* for 1896.) This preparation, the composition of which corresponds to the formula $C_6H_4.OCH_3.I$, forms yellow or reddish-yellow crystals, which melt at $47^\circ C.$, and are soluble in alcohol and ether. It possesses powerful antiseptic properties, but its therapeutic value still requires to be established by clinical observations.

Amyloform. A. Claassen. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 599, and xxxv. 94.) Amyloform is stated to be a chemical combination of formaldehyde and starch, and is described by the author as a white, odourless powder insoluble in all solvents. Secretions and tissues decompose it with the liberation of formaldehyde. It is said to be very valuable in the treatment of wounds, as it checks secretion much more energetically than iodoform, and to have the advantage of being harmless and non-irritant. In putrid purulent discharges it also acts as a powerful deodorizing agent. Amyloform gauze can be sterilized without any risk of decomposition.

Dextroform. A. Claassen. (*Pharm. Zeitung*, xlii. 422.) This preparation has been introduced by the author as an antiseptic particularly serviceable in the treatment of gonorrhœa. It is a compound of dextrin with formaldehyde in the form of a white, nearly odourless and tasteless powder, insoluble in alcohol, ether, and chloroform, but readily soluble in water or glycerine. The aqueous solution is neutral, and is not coloured blue by iodine. The powder parts with a little moisture (0.3 per cent.) at $105^\circ C.$ without suffering any change; at 200° it begins to melt and to swell out, and at 240° it is decomposed into formic acid, acetic acid, and other products. It leaves 0.27 per cent. of ash. Dressings prepared with dextroform can be sterilized without any risk of decomposition.

The chief advantage this remedy has over amyloform (preceding abstract) consists in its solubility in water and glycerine.

Trioxymethylene. M. Janet. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 5, from *Pharm. Centralhalle*.) Trioxymethylene (paraformaldehyde) is a condensation product of formaldehyde, and is recommended by the author for the sterilization of indiarubber probes, which are said to be injuriously affected by the water of ordinary aqueous solutions of formaldehyde.

Holzin, Holzinol, and Sterisol. E. Rosenberg. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 733, 734.) *Holzin*.—This is a 60 per

cent. formaldehyde solution in methyl alcohol, which is strongly recommended for the disinfection of rooms, etc., for which purpose it is poured upon asbestos plates, and slowly evaporated by the gradual application of very gentle heat. In a similar manner it is used for the sterilization of articles of food; these, if thus sterilized, and then covered with a coating of gelatin, are stated to keep unaltered for months. It is also recommended as an efficient means of immunising cattle against foot and mouth disease. As an internal remedy it has proved serviceable in phthisis, diphtheria, whooping cough, and coryza. The author considers this preparation as the antiseptic *par excellence*, as it destroys bacteria without injury to the human organism.

Holzinol is holzin with an addition of a small proportion of menthol. Culture experiments have shown that solutions of 1:75,000 are strong enough to kill pathogenic germs. A 0.3 per cent. solution is well suited for sterilising the floors of hospital wards, schoolrooms, etc., which only require to be wiped over with rags saturated with the solution.

Sterisol is a solution of milk sugar saturated with formaldehyde, and is given internally in doses of 0.015 gramme in phthisis, erysipelas, and diphtheria. The dose may be gradually increased up to 0.06. Its administration produces no change in the microscopic appearance of the blood, and does not give rise to the elimination of albuminous urine. Urine passed during the treatment with this substance, when peptonised and treated with cultures of typhoid bacilli, remains sterile.

Mildiol. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 734.) A mixture of creosote and mineral oils is offered under this name as a general disinfectant.

A New Antiseptic and Disinfectant. F. Fritzsche. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 794.) The substance reported upon is prepared by boiling an alcoholic solution of two molecular weights of *o*-oxyquinoline with one molecular weight of potassium or sodium pyrosulphate for ten to twelve hours, or until the reaction is completed. The resulting product is freed from alcohol without the application of heat, and then dried and powdered. It is soluble in water in all proportions; the aqueous solution is capable of dissolving phenols (such as resorcin, cresol, etc.), and to retain them in the form of a clear solution regardless of the degree of dilution. The preparation is odourless, non-poisonous, and non-corrosive, and possesses remarkable bactericidal powers.

The constitution of this new compound has not yet been ascertained.

A New Solution of Coal-Tar. A. Sack. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 794.) The preparation referred to by the author is obtained by dissolving 10 parts of coal-tar in 20 parts of benzol and 77 parts of acetone.

Eucalypteol. (*Pharm. Zeitung*, from *Deutsch. Med. Wochenschr.*) This preparation is a hydrochloric acid compound of eucalyptene, prepared from oil of eucalyptus leaves. It is non-toxic, and is proposed as an internal antiseptic and a substitute for eucalyptol. Dose 1·5–2 grammes.

Hydrargyroseptol. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 116.) Hydrargyroseptol, $C_9H_6N.O.SO_3Hg + 2NaCl$, is a compound of chinosol-mercury introduced by Fritzsche as an antiluetic.

Silico-Fluoride of Mercury as an Antiseptic. MM. Hallion, Lefranc, and Poupinel. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 599.) This mercury salt is regarded by the authors as an excellent antiseptic. It is much less poisonous than corrosive sublimate, and is twice as active on *Bacillus pyocyaneus*, *B. diphtheriticus*, and *B. anthracis*. It is applied in aqueous solution 1:1000, or in the form of an ointment containing 1 part of the salt to 2,000 parts of vaselin.

Antiseptic Action of Cerium Salts. (*Pharm. Post*, xxx. 103.) Cerium salts, and especially the nitrate, are recommended as active germicides, which have the advantage of being non-toxic to higher organisms. A solution of 1 part of the nitrate in 1,000 parts of water proves an efficient surgical antiseptic, and has no irritating action on the tissues.

Bismuth Tribromophenate. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 94.) This is a non-poisonous, stable, odourless and tasteless powder, possessing marked antiseptic, antifermentative and desiccating properties. It is employed in the treatment of wounds, eczema and skin diseases, the mode of application being similar to that of iodoform. Injections containing 1 part to 10 parts of water are stated to be useful in gonorrhœa.

New Local Anæsthetics. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 53.) The preparations here referred to are *benzoyltriacetone-* and *benzoyldiacetone-alkamin*, of which the former melts at 97°, and the latter at 94° C. These substances combine with inorganic and organic acids forming neutral salts, which possess anæsthetic, alkaloid-like properties.

Methethyl. (*Pharm. Zeitung*, xlii. 200.) This is a local anæsthetic introduced by G. F. Henning, and is stated to consist of ethyl chloride with small proportions of methyl chloride and chloroform. It is a clear, colourless, neutral liquid, soluble in all proportions in alcohol, ether, or chloroform, and having a pleasant characteristic odour and sweet pungent taste. It boils at 10.5°C ., solidifies at -30°C ., and has a specific gravity of 0.9173 at 4°C . It burns with a green-edged flame, leaving no residue.

Holocaine, a New Local Anæsthetic. (*Pharm. Centralhalle*, xxxviii. 163.) This new antiseptic is the hydrochloride of *p*-diethoxyethylenediphenylamidine, and is introduced into ophthalmic practice as a substitute for cocaine hydrochloride. The base is a derivative of *p*-phenetidin, and is formed by the union of one molecule of the latter with one molecule of phenacetin with elimination of water. It melts at 121°C ., is insoluble in cold water, but readily soluble in alcohol and ether, and possesses the characters of a strong base. Its hydrochloride crystallises in white needles, and forms a perfectly neutral solution in hot water; the solution, after cooling, retains 2.5 per cent. of the salt, and suffers no change even on prolonged boiling. Altogether the salts of this base and their solutions show considerable stability.

Cocaine-Aluminium Citrate. J. D. Riedel. (*Ber. der deutsch. chem. Ges.*, 1896, 816.) A compound consisting of three molecules of aluminium citrate and one molecule of cocaine is formed whenever a solution of the aluminium salt is treated with cocaine or its citrate. If the solution is sufficiently concentrated, the double salt separates in the form of a crystalline precipitate. It is difficultly soluble in cold, and more readily soluble in hot water, but insoluble in alcohol and ether; it has a bitter taste, and combines astringent with anæsthetic properties. It is introduced as a therapeutic agent.

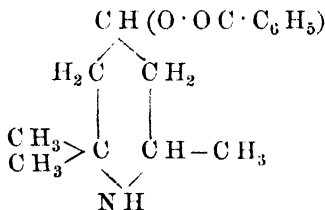
Further Observations on Eucaine. (*Revue de Thérap.*, June 15th, 1896, and *Brit. Med. Journ.*, No. 1881, 134.) This substance has been previously reported upon as a local anæsthetic, and a suitable substitute for cocaine (see *Year-Book of Pharmacy*, 1896, 180). More recent reports corroborate its value as an anæsthetic and its greater freedom from the objectionable features appertaining to cocaine. Its advantages over cocaine, especially in ophthalmic practice, are now confirmed by Berger, while W. J. Horne and M. Yearsley give an account of its use in the surgery of the throat, nose, and ear. They have applied it in solutions varying

in strength from 2 to 8 per cent., and express themselves well satisfied with its action.

All observers seem to agree that eucaine compares favourably with cocaine in its anæsthetic action, that it is less toxic, and that it is the safer remedy of the two on account of its comparative freedom from any disturbing influence on the heart. Attention is also called to the superior stability of its solutions in sterilised water.

Eucaine B. (*Pharm. Centralhalle*, xxxviii. 355.) Recent observations to the effect that eucaine hydrochloride is liable to produce a burning sensation when applied to the eye, have induced Silex to introduce a new compound of the same class, which he finds to be better adapted for ophthalmic use. It is the hydrochloride of a benzoylvinyldiacetone-alkamine, for which the name eucaine B is proposed to distinguish it from eucaine, or eucaine A, as the older preparation is now to be called. Chemically it is closely related to the latter, and also to cocaine, and especially to tropacocaine, but it is less toxic than either of the two last-named substances. Water dissolves 5 per cent. of the hydrochloride, and yields a readily sterilisable solution. Though the hydrochloride of the new compound is less irritating, it is in no wise inferior in its anæsthetic action to that of eucaine A. A 2 per cent. solution is recommended as best adapted for ophthalmic use.

The constitution of eucaine B is represented by the formula—



Glycosolvol, a New Antidiabetic Remedy. O. Lindner. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 180.) This remedy is a combination, partly resulting from the action of oxypropionic acid on peptone and partly from the action of a theobromine compound on trypsin. It is stated to possess the power of rapidly decomposing carbohydrates in the organism, and is given in conjunction either with fluid extract of bilberries or with *Syzygium*. Complete disappearance of sugar in the urine has been observed after a few weeks' treatment, assisted by careful diet, in cases

in which the sugar had amounted to 45 per cent. This result has been accompanied by a corresponding increase of body weight, and a marked improvement in the physical and mental condition of the patient.

Asparol. J. E. Stroschein. (*Pharm. Zeitung*, xlii. 422.) This name is given by the author to a preparation obtained from asparagus, which is introduced as a dietetic suitable in diabetes and kidney affections. It is a dark-brown fluid extract, having a pleasant, slightly alcoholic odour and a sweet saline taste, and is stated to contain all the extractive constituents of asparagus in a concentrated form. Its percentage composition appears to be as follows:—Alcohol, 10; water, 53; proteids (including asparagin), 9.71; invert-sugar, 0.09; non-nitrogenous extractive, 19.9; mineral constituents, 7.30; phosphoric acid, 0.69; iron, 0.14.

Saxin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 400.) This preparation, like saccharin and dulcin, is a sweetening agent, which is stated to be harmless, non-fermentative, and 600 times sweeter than sugar. It also has an antiseptic action, and is recommended as a sweetening agent in all cases in which sugar is inadmissible, particularly in diabetes.

Spinol. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 573.) This name is applied by Stroschein to a dietetic preparation obtained from spinach leaves. It is a brown, syrupy, nutritive liquid containing also iron and phosphoric acid.

Nutrose. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 793, xxxv. 160 and 235.) Nutrose is a new food preparation, consisting of a sodium compound of casein.

Röhmman and Liebrecht have investigated a series of compounds of casein and alkalis or alkaline earths, and find the acid sodium salt to be the most suitable for dietetic purposes. This salt, to which the name nutrose is specially applied, may be prepared by the evaporation of a casein-soda solution in vacuo, or by the precipitation of such a solution by means of acetone, or, finally, by boiling a mixture of dried casein and solid sodium hydrate with alcohol. It is a fine white powder, soluble in warm water and also in a large proportion of dilute acids, yielding slightly opalescent solutions. It has a mild, cheesy taste, and may be given in quantities of one or two ounces daily, dissolved in milk or broth. It is readily digestible, and is stated to be capable not merely of making up for the daily waste of nitrogen, but also of increasing the quantity of albumin stored in the fluids and tissues of the organism. The nitrogen contained in

this preparation amounts to 13·8 per cent. It is specially recommended as a nutritive substance in cases of diseases of the stomach or bowels; also in chlorosis, scrophulosis, in general debility, and during convalescence after prolonged illness. Favourable reports upon its action are published by several investigators.

Eucasin. (*Bull. Comm.*, xxiv. 226.) This is a dietetic preparation similar to nutrose (preceding abstract), consisting of an ammonia compound of casein. It agrees with nutrose in its general properties. Eucasin has been introduced by E. Salkowsky and W. Majert.

Somatose. (*Pharm. Journ.*, 4th series, iii. 246.) The preparation, introduced under this name by Bayer & Co. as a nutritive agent, is a light, almost colourless powder, consisting chiefly of soluble albumose, and containing the alkaline phosphates of flesh. It is stated to be free from any unpleasant taste, and to be useful in promoting the secretion of milk in nursing mothers. Its condensed form and ready assimilation is said to render it especially suitable food in febrile diseases or disordered conditions of the stomach and intestines. It is given in quantities of one teaspoonful, 3 or 4 times a day, dissolved in warm milk or weak broth.

Taka-Diastase. M. Leo. (*Therap. Monatshefte*, 1896, No. 12.) Taka-diastase is an enzyme extracted in the United States on a large scale from *Aspergillus oryzae*. Its administration is recommended by the author in cases of insufficient or disturbed formation of saliva in the mouth, or of hyperacidity of the stomach. While the saccharifying action of ptyalin (or saliva) or of malt diastase on starch ceases, when the amount of free hydrochloric acid in the gastric juice reaches or exceeds 0·01 per cent., taka-diastase is still active in the presence of even 0·05 per cent. of acid. Constipation, which is so often associated with hyperacidity, is also relieved by the administration of this diastase. The dose of the remedy is 1-3 grammes dissolved in water and taken during the meal.

Lactopeptin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 74, from *Pharm. Centralhalle*.) This name is given to a digestive remedy composed of 24 parts of pepsin, 18 parts of pancreatin, $1\frac{1}{2}$ of diastase, 120 of milk sugar, 2 of hydrochloric acid, and 2 of lactic acid.

Lactomaltine and Ambrosia. (*Pharm. Journ.*, 4th series, iv. 196 and 203.) The name lactomaltine is given to a combination of

malt extract with milk and cream, which is claimed to be an ideal flesh-forming food.

Ambrosia.—This is a similar preparation, consisting of malt extract with 25 per cent. of rich Devonshire cream, and is offered as a substitute for cod-liver oil.

Protogens. F. Blum. (*Pharm. Zeitung*, from *Berlin. klin. Wochenschr.*) The term protogens designates a new class of albumin compounds differing essentially from those hitherto known. They are methylene compounds of albumins prepared by a synthetic process consisting mainly in the action of formaldehyde on serum-albumin or egg-albumin. The final products are free from formaldehyde, and may probably be regarded as albumins in which two hydrogen atoms of one or two amido-groups are replaced by the radical methylene.

Ovoprotogen, as prepared by Meister, Lucius, and Brüning, is a yellow powder containing about 7.1 per cent. of moisture and 12.7 per cent. of nitrogen, corresponding to about 80 per cent. of albumin. If this preparation be desiccated by heat, it partially loses its solubility and seems to undergo an alteration in its molecular structure.

Dr. Blum hopes to be able to use protogens with success as an addition to milk in the treatment of debility in children, and also as a suitable food for subcutaneous use. Experiments on animals have given encouraging results.

Alcarnose. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 355.) This is a new food preparation introduced by Riedel, and consisting of 17.4 per cent. of proteids, 7.6 per cent. of fat, 72 per cent. of carbohydrates, and 3 per cent. of mineral matter (containing all the saline constituents of meat with traces of iron). The proteids and carbohydrates are stated to be present in it in a soluble form. It is described as a thick, brown, extract-like substance readily soluble in warm water, and having a pleasant taste. It is offered in gelatin capsules weighing 12 grammes each, one of which is sufficient for a cup of water.

Hæmalbumin and Parahæmoglobin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 326 and 327.) These are two preparations of blood-albumin, containing respectively 0.25 per cent. and 5 per cent. of iron in organic chemical combination. Both are given in the form of powder mixed with milk-sugar or cane-sugar and flavoured with oil of cinnamon or vanilla.

Hæmoneïn. (*Pharm. Zeitung*, 1896, 894.) This preparation is introduced by F. Rebling as a nutritive extract composed of

extract of meat and the saline constituents of normal healthy blood. It is intended to act as a nutritive tonic and stimulant in cases of debility arising from illness, over-exertion, etc.

Hæmatogen. (*Pharm. Zeit. für Russl.*, xxxv. 500.) The preparation introduced under this name by Hertel is obtained by dissolving a small quantity of ferric hydrate in fresh ox-blood in the presence of a trace of solution of sodium hydrate.

Vitellinate of Iron. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 160 and 233.) Under the name *Liquor ferri vitellinati*, a new dietetic remedy has been introduced by Groppler as a substitute for cod-liver oil. It contains a compound of egg-yolk with 0.4 per cent. of iron, which can also be administered in combination with oil as an emulsion. Aufrecht, who has chemically examined this preparation, finds that it contains the iron in a state of organic combination in which it cannot be directly detected by the usual reagents. The preparation has a very pleasant taste, and can be kept for a long time without undergoing any change. It does not contain any glycerine.

Ferrosol. F. Stahlschmidt. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 945.) This name is applied by the author to a new saccharated iron preparation, viz., a double saccharate of ferric oxide and sodium chloride, containing 0.77 per cent. of iron. This preparation is stated to be readily digestible and assimilable, and to possess absolute stability.

Ichthalbin. A. Sack. (*Deutsch. Med. Wochenschr.*, 1897, No. 23.) *Ichthalbin* (*Ichthyol-Albumin*) is a compound analogous to tannalbin, and is recommended by the author in the place of ichthyol for internal medication. It is stated to possess the same therapeutic properties as pure ichthyol, without producing the troublesome secondary effects (eructation, vomiting, etc.). Ichthyol solutions, when mixed with solution of albumin, form a precipitate of ichthyol-albumin, which at first retains the odour and taste of pure ichthyol, but loses these after prolonged heating or long-continued washing with alcohol and large quantities of water. In this manner, the compound (*ichthalbin*) is obtained in the form of a very fine, greyish-brown, odourless, and almost tasteless powder, which is insoluble in dilute acids but completely soluble in alkaline solutions, from which it can be re-precipitated by acids. It is administered in doses of 1 to 2 grammes 2 or 3 times a day. The compound is broken up in the intestine into its two constituents, ichthyol and albumin.

Use of Ichthyol in Ophthalmic Practice. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 381.) In addition to its other uses, this remedy has now also found its way into ophthalmic practice. It has been employed with considerable success in affections of the conjunctiva, both in aqueous solution and in combination with vaselin. Its success in this direction seems to be due to its astringent and anodyne properties.

Argonin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 573, 687, 713, and xxxv., 203.) Argonin (silver caseinate) has been previously reported on as a remedy for gonorrhœa (see *Year-Book of Pharmacy*, 1895, 214, and 1896, 182). Its efficiency in the treatment of this disease is now further confirmed by Jadassohn, Meyer, Schäffer, Lewin, Zydłowicz and others, all of whom testify to its marked power of destroying the gonococci and its freedom from corrosive action on the mucous membrane of the urethra when injected into the latter.

Argentol (Argentum Chinoseptolicum). (*Pharm. Centralhalle*, xxxviii. 163. From *Pharm. Journ.*) According to Fritzsche, argentol is a compound of silver with oxychinolin obtained from chinisol. It is more suitable for use than lactate or citrate of silver. It is readily decomposed, and in the presence of septic substances splits up into oxychinolin, which is an active antiseptic, and metallic silver, both of which have bactericidal action. Argentol is so readily decomposed that if boiled with water it at once deposits minutely divided silver. It is a non-irritant, non-poisonous powder, difficult to dissolve, but can be easily distributed. It is an excellent substitute for iodoform, and other silver preparations which on decomposition give silver oxide instead of metallic silver. It is applied as a powder to wounds, granulations, festerings, skin diseases, ulcers, also as an ointment with vaselin and lanolin, 1:50-100, and in emulsions or injections for gonorrhœa, 1:300-1000.

Anusol. F. Buchka. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 792.) This name is applied to a bismuth salt of iodoresorcin-sulphonic acid, which is used in the form of suppositories for the treatment of piles. This preparation should not be confounded with "anozol," which is a combination of thymol and iodoform.

Airol in Leprosy. (*Nouv. Rem.*, xiii. 108.) Airol (bismuth oxyiodogallate) has met with a previous notice in the *Year-Book of Pharmacy*, 1895, 207, as a substitute for iodoform. It is now recommended also for the treatment of leprosy, and used for this purpose in the form of a 10 per cent. ointment made with

vaselin, and likewise in the form of a 10 per cent. glycerine solution for injection into the ulcers. Fornara reports severe cases of leprosy which were greatly ameliorated by this treatment.

Ethylenediamine-Cresol. (*Pharm. Zeitung.*) This substance was first reported upon by Baer, and has now been further investigated by Schäfer. It is a clear, colourless, and practically non-poisonous liquid, possessing in a marked degree the power of permeating the skin, and surpassing cresol in its antiseptic action. It has been applied with success in ulcerating processes, also in suppurating glands, and in lupus. It is stated to be at least equal in its action to iodoform, acetate of alumina, and silver nitrate ointment. In eczema, psoriasis, and in gonorrhœa it proves to be inefficient.

Alsol, Boralid, Glybolid, Boricin, and Byrolin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 945.) *Alsol* is a trade name applied to aluminium acetotartrate.

Boralid is a mixture of antifebrin and boric acid, recommended for the treatment of eczema.

Glybolid, also called *glybrid*, is a paste composed of boralid and glycerine, and is used for surgical dressings.

Boricin is a mixture of borax and boric acid.

Byrolin is a special name adopted for boroglycerine-lanolin.

Adhaesol, Amylocarbol, Amyloiodoform, Iodoformsalol, Chloridene, Omal, Gallobromol, and Sozoborol. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 73, 74.) *Adhaesol* is an ethereal solution of benzoin, balsam of tolu, copal resin, oil of thyme, and α -naphthol, and is suggested as a substitute for steresol.

Amylocarbol is a solution of 9 parts of carbolic acid and 150 parts of soft soap in 160 parts of amyl alcohol and a sufficient quantity of water to make up 1000 parts.

Amyloiodoform is a preparation consisting of iodine, starch, and formaldehyde, and is intended for medicinal use.

Iodoformsalol.—This is a combination of iodoform and salol, melting at 40° C. It is recommended by Reynier for filling cavities in tubercular disease of the bones.

Chloridene.—This is a synonym for ethylidene chloride.

Omal is a new designation for trichlorophenol. This preparation is employed for inhalations in inflammatory conditions of the respiratory passages.

Gallobromol.—Another name for dibromogallic acid, which is used internally as a substitute for bromides, and externally in the treatment of gonorrhœa.

Sozoborol is a mixture of aristol, sozoiolol and borates, which is applied for colds.

Anæsin, Collaform, Hæmotrophin, Ossalin, Ossin, and Steriform. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 355-357.) *Anæsin*.—This is a 1 per cent. aqueous solution of acetone-chloroform, and is employed as a local anæsthetic in ophthalmic and dental practice.

Collaform.—This name is applied by C. F. Hausmann to powdered formaldehyde-gelatin as used for the antiseptic treatment of wounds.

Hæmotrophin is a stable, liquid hæmoglobin-preparation having a pleasant taste.

Ossalin (Adeps ossium).—This is a fatty ointment base prepared from bone-marrow. It is a mild, neutral fat, of a greyish-white colour and perfectly free from any irritating action. It is most readily absorbed by the skin, and is capable of taking up 200 per cent. of water.

Ossin (Extractum ossium liquidum).—This preparation, introduced (like the preceding one) by J. E. Stroschein, is a dark-brown fluid extract having a slightly bitter taste, and is proposed as a remedy for diabetes. It is stated to contain 8.82 per cent. of water, 12.12 per cent. of nitrogen, 9.40 per cent. of saline constituents (phosphoric acid, sulphuric acid, chlorine, potash, soda, lime, magnesia, and iron), 61.25 per cent. of extractive soluble in alcohol of 80 per cent., and 0.06 per cent. of extractive soluble in ether.

Steriformium chloratum.—This remedy, recommended for various infectious diseases, consists of 5 per cent. of formaldehyde, 10 per cent. of ammonium chloride, 20 per cent. of pepsin, and 65 per cent. of milk-sugar. It is stated to be tasteless and non-poisonous, and to contain the formaldehyde in a state of chemical combination.

Steriformium iodatum.—This is employed as a dusting-powder for wounds, and has the same composition as the preceding preparation except that it contains ammonium iodide instead of the chloride.

Pharmaceutical Preparations of Iodol. (*Pharm. Centralhalle*, xxxviii. 475.) *Iodol Collodion*.—Iodol, 1 part; ether, 5 parts; collodion, 10 parts. This is used for covering open or suppurating wounds.

Alcoholic Glycerol of Iodol.—Iodol, 1 part; alcohol, 16 parts; glycerine, 14 or 34 parts.

Iodol Lanolin.—Iodol, 5 or 10 parts; lanolin, 90 or 95 parts.

Iodol Vaseline.—Iodol, 1 to 2 parts ; vaselin, 10 parts.

Iodol Ether.—Iodol, 10 or 20 parts ; ether, 20 to 80 parts.

Juniper Collodion. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 416.) This preparation consists of 2 parts of acetone collodion and 1 part of *ol. junip. empyr.* (cadin oil), and is applied by means of a brush in psoriasis.

Filmogen. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 686 and 945.) Filmogen is a new vehicle recently introduced into dermatological practice. It is obtained by dissolving nitrocellulose in acetone and adding a small quantity of a fixed oil to the solution. When applied to the skin it leaves a flexible film which is not liable to break, and is not removed by washing with water. The action of medicaments applied by means of this vehicle can thus be readily prolonged as much as appears desirable, without the necessity of renewed application. Schiff, Kaposi, Lassar, Unna, and Pawlow report favourably on the usefulness of this preparation.

Celloidin as a Substitute for Collodion. (From *Brit. Med. Journ.*) Celloidin, a highly concentrated collodion obtained from ordinary collodion by evaporation, forms a transparent, strongly opalescent membrane. Williamson advocates the use of a solution of 2 parts of celloidin in 15 parts of ether and 15 parts of alcohol as a substitute for ordinary collodion in dressing cuts, cracks, punctures and excoriations. It leaves a more tenacious and durable film than ordinary collodion.

Gossypium Hæmostaticum. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 279, from *Pharm. Zeitschr. für Russl.*) According to Grünig, a good and efficient preparation is obtained by dissolving crystallised ferric chloride in an equal weight of ether, saturating the cotton wool with this solution, and allowing the ether to evaporate quickly.

Glutoform. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 686.) This name is given to a chemical compound of formaldehyde and gelatin, prepared by a patented process. It is stated to be not identical with a similar preparation introduced under the names "glutol" and "collaform."

Glutoid Capsules. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 73.) These capsules are prepared from gelatin which has been hardened by the action on it of formaldehyde. According to Sahli, they resist the action of the gastric juice, and are not dissolved until they reach the intestines. In this respect they are found to be much more reliable than keratin capsules, or keratin pill-coating.

Substitute for Gutta-Percha Tissue. (*Pharm. Zeitung.*) In order to render ordinary tissues waterproof so as to make them serviceable in the place of gutta-percha tissue for antiseptic dressings, etc., they are soaked in a solution of gelatin and then exposed to the action of gaseous or dissolved formaldehyde. By this treatment, the gelatin becomes insoluble in hot water, and forms a flexible, uniform, and elastic coating.

Plaster Papers. C. Herxheimer. (*Therap. Monatsh.*, October, 1896.) This term is applied to pieces of unsized rice-paper, coated on one side with adhesive plaster or soap plaster. The adhesive plaster used for this coating may be previously mixed with various medicaments, such as zinc oxide, salicylated creosote, Peruvian balsam, oil of cade, chrysarobin, pyrogallie acid, salicylic acid, mercury, etc. These "chartæ adhæsivæ," with or without medicaments, are generally 1·5 metre long, and 0·2 metre broad.

Pyrogallolum Oxydatum. H. Unna. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 867, from *Apoth. Zeitung.*) The author finds that this preparation has no effect whatever on the healthy skin, but only affects the diseased part. Even after prolonged application it produces no toxic effect. Internally administered it is without action on the circulation. Compared with pyrogallol it has, moreover, the advantage of much greater stability.

Naphthalan. P. Schröder. (*Ber. der deutsch. pharm. Ges.*, and *Pharm. Zeitschr. für Russl.*) This preparation is introduced as a remedy for skin diseases, and as an ointment base, and is stated to consist mainly of a thick, blackish-green fatty substance, melting at 65–70° C., and having a peculiar empyreumatic odour. It is said to be most readily absorbed by the skin. The raw material for its preparation is obtained from a petroleum spring at Naphthalan in the Caucasus. It is soluble in vaselin, chloroform, carbon bisulphide, amyl alcohol, and ether, and slightly soluble in ethyl and methyl alcohols, yielding fluorescent solutions. When heated it burns with a luminous, smoky flame, and finally yields 0·37 per cent. of ash, consisting of sodium and potassium carbonates. Its application is harmless. It is stated to have an antiseptic and healing effect in burns, wounds, and ulcers, and to be capable of relieving rheumatic and gouty pains; but it is chiefly recommended for all kinds of skin diseases, including leprosy.

Aluminium Oleinicum. (From *Chem. Zeitung.*) This preparation is proposed as a substitute for traumaticin. It is prepared by mixing an aqueous solution of olive oil soap with a solution of

alum, then triturating the resulting glutinous mass with a small quantity of lukewarm water, and dissolving it in ether.

Gelanthum. P. Runge. (*Pharm. Zeitung*, xli. 694.) The preparation introduced under this name into dermatological practice is a water-soluble skin varnish composed of tragacanth and gelatin. It is prepared by soaking tragacanth in water for several weeks until a uniform paste is obtained, which is then heated on a steam-bath and strained. The gelatin is separately dissolved in five times its weight of hot water, the solution sufficiently heated to somewhat reduce its tendency to set, and then filtered through Unna's steam-pressure funnel. The two solutions are then mixed, the mixture is heated on a water-bath and stirred until quite uniform, and then mixed with 5 per cent. of glycerine. Finally a very small quantity of thymol is added to prevent mouldiness, and the product slightly perfumed with otto of rose. It is a transparent jelly which, when rubbed on the skin, leaves a flexible, shiny coating. It is miscible with all medicaments, without losing its properties. Most medicaments should be mixed with water before incorporating them with the gelanthum; oils and fats are first emulsified with gum arabic. Tar, cadin oil, and similar substances, should be first mixed with spirit. saponat. kalin. before incorporation. Gelanthum is also well adapted for the preparation of a water-soluble ichthyol varnish.

Adipatum and Mollosinum. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 687.) The preparations introduced under these names are new ointment bases.

Adipatum is composed of 7 parts of white paraffin, 35 parts of anhydrous lanolin, 53 parts of vaselin, and 5 parts of water.

Mollosinum is a combination of 4 parts of liquid paraffin and 1 part of beeswax.

Alapurin. H. Beckurts. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 618.) Alapurin, the new pure wool-fat, has already met with a short notice in the *Year-Book of Pharmacy*, 1896, 182. The author of the present paper supplies the following additional information:—Alapurin, as met with in commerce, is a substance of the consistence of a soft ointment, and begins to flow like a thick oil at 46° C. It is almost odourless, and readily soluble in ether or chloroform, but only very slightly soluble in alcohol. When the chloroform solution is carefully poured upon strong sulphuric acid, a brownish-red zone characteristic of cholesterins is formed between the two layers. 350 parts of water are miscible with 100 parts of the fat, if carefully incorporated. The fat burns

with a luminous, smoky flame, and yields 0·006 per cent. of ash having a neutral reaction.

The addition of 2 drops of phenolphthalein to a solution of 2 grammes of alapurin in 10 c.c. of ether yields a colourless mixture, while the addition of a few drops of decinormal alkali solution imparts a fine red colour to the ethereal solution. The quantity of alcoholic decinormal potash solution required to neutralise an ethereal solution of 3 grammes of the fat corresponds to only 0·112 milligramme of potassium hydrate. The fat is therefore free from acids. It is also free from glycerine and ammonia compounds.

Hübl's iodine number was found to be 20·62 to 20·96.

The foregoing characters sufficiently indicate that alapurin surpasses other kinds of wool-fat in its purity and freedom from odour.

Salicyl-Lanolin. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 5.)

This preparation is a mixture of 80 parts of lanolin with 10 parts each of salicylic acid and oil of turpentine, and is recommended by Husson for external use in rheumatism.

Cocaine Ointment. (*Chemist and Druggist*, 1897, 620.) This ointment is open to the objection that the cocaine hydrochloride dissolved in the hot vaselin crystallises out on cooling. According to Lamanna, this may be prevented by dissolving the cocaine salt in a very small quantity of water, then mixing the solution with lanolin, and finally with the vaselin.

Formulæ for Eucaine Ointments. (*Therap. Monatshefte*, xi. 137.)

Eucaine Ointment.

Eucainæ Hydrochlorici	. . . . .	1
Ol. Olivæ	. . . . .	2
Lanolin	. . . . .	7

M. f. unguentum.

This ointment is specially suitable for rendering tissues and painful wounds anæsthetic.

Eucaine Menthol Ointment.

Eucainæ Hydrochlorici	. . . . .	10
Mentholi	. . . . .	2
Lanolin	. . . . .	ad. 100
Ol. Olivæ	. . . . .	20

M. f. unguentum.

D.S.—To be rubbed in externally. For itching hæmorrhoids, pruritus ani, and pruritus pudendi.

Thiosavonal. (*Monatsh. für prakt. Dermat.*, 1896, 319.) Thio-savonals are soft water-soluble sulphur soaps which, according to Müller and Grube, is obtained from thio-oil (J. D. Riedel's patent) by saponification with potash solution. The following two distinct preparations are described:—

Neutral thiosavonal (soft sulphur soap) is obtained by thinning the thick thio-oil with alcohol, and gradually mixing it by constant stirring with an equivalent quantity of potash-lye which also has been previously diluted with alcohol. The potash solution requires to be added in small successive quantities at a time. The complete saponification of the oil is recognised by the clearness of the mixture and the perfect solubility in alcohol of a small sample. Any excess of alkali is finally neutralised with ethereal solution of fatty acid. The resulting solution is freed from alcohol on the water-bath and evaporated to the consistence of a soft ointment, which is then mixed with 18 to 20 per cent. of glycerine. The product contains 12 per cent. of moisture, and 5 per cent. of the potassium compound of thio-fatty acid.

Liquid thiosavonal (liquid sulphur soap) is prepared in the same way, except that the soap solution is only evaporated to the consistence of a syrup and the product mixed with 13 to 14 per cent. of glycerine. The water in this preparation amounts to 29·6 per cent., and the potassium salt to 4 per cent.

Sulphuraria. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 30, from *Pharm. Centralhalle.*) This is a yellow powder deposited from the thermal sulphur springs of San Filippo. It is applied either in the dry state or in the form of a paste made with water, or in that of an ointment in various skin diseases. It contains 30·96 per cent. of sulphur, 36·55 of calcium sulphide, 15·88 of calcium carbonate, 13·44 of organic matter, and 1·07 of silica, calcium fluoride, and strontium sulphate.

Fango. A. Klumpp. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 792.) This term is used in Italy for the silt deposited from the hot springs of Battaglia, which is employed in the form of poultices in gout, rheumatism, and affections of the urinary and genital organs.

Calcium Chloride in Pruritus. (*Lancet*, 1896, 300.) When given in doses commencing at 20 grains and gradually increased up to 40 grains, calcium chloride is found by Savill to exert a markedly beneficial effect in cases of general or local pruritus. The dose should be taken after meals, and the taste disguised by tincture of orange peel and chloroform water. Chloride of

calcium thus administered has proved successful where other remedies have failed. Careful dieting is necessary.

Potassium Permanganate for Skin Eruptions and Itching. (*New York Med. Journ.*) A 1 or 2 per cent. solution of potassium permanganate is recommended by Bulkley for the local treatment of rashes and the relief of itching. The brown stains left by this application are subsequently removed by means of solution of zinc sulphate.

Oil of Turpentine for Burns. (*Brit. Med. Journ.*, from *New York Med. Rec.*) MacInnes states that oil of turpentine applied to a burn by means of a thin layer of absorbent cotton will quickly relieve the pain and promote rapid healing. Should large blisters be raised, these are opened on the second or third day. The application of the turpentine should be strictly confined to the affected parts.

Magnesia Paste for Burns. M. Vergely. (*L'Union Pharm.*, xxxvii. 346.) A paste prepared from calcined magnesia with milk is recommended as an excellent application for burns. It is spread in a thick layer upon the affected parts, and renewed several times daily.

Potassium Nitrate for Burns. (*L'Union Pharm.*, xxxvii. 346.) A cold saturated solution of saltpetre, applied to fresh burns, is stated to quickly relieve pain, to lessen inflammation, and to prevent the formation of blisters. Poggi employs the solution by means of compresses changed very frequently.

Bismuth Paste for Orchitis, Sunburn, etc. (*Mod. Med.*, v. 12. From *Pharm. Journ.*) A thick paste of bismuth subnitrate with water is one of the best applications for swollen testicle. It relieves the pain and burning sensation, and the swelling rapidly subsides. It is equally useful for burns and scalds and as an application for sunburn, blistered skin, and chafing.

Methyl Violet for Boils, Carbuncles, and Anthrax. (*Therap. Gaz.* [3], xii. 615.) Trenite has recently recommended the use of $\beta\beta$ -methyl violet for boils, etc. Fifteen minims of a 2 per mille solution are injected into the boil; the pain disappears in a few hours and a cure is generally complete in two days. Should true carbuncle or anthrax be present, the necrotic area should be slit open by means of a bistoury or tenotome, and all necrotic matter removed before the injection is made. The cavity is afterwards packed with iodoform gauze which has been soaked in a solution of hot sodium chloride.

Ointment for Chilblains. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 280.)

Acid. carbol.	. . . . .	2.0 grammes.
Ung. plumbi	} of each	40.0 "
Lanolini		
Ol. oliv.	. . . . .	20.0 "
Ol. lavand.	. . . . .	25 drops.

Frostbite-Salve. (From *Chemist and Druggist*.)

Acidi carbonici	. . . . .	5ss.
Ung. diacylon.	. . . . .	3x.
Lanolini	. . . . .	5x.
Ol. olivæ	. . . . .	5v.
Olei lavandulæ.	. . . . .	℥x.

Fiat unguentum.

Freckle-Lotion. (*Chemist and Druggist*, from *Seifenfabrikant*.)

Zinci oxidi	. . . . .	3j.
Calamin.	. . . . .	3j.
Hydrarg. ammon. chlor.	. . . . .	gr. xv.
Glycerini	. . . . .	3ij.
Aq. rosæ ad	. . . . .	3vj.

Anti-Mosquito Application. A. D. Cantab. (*Chemist and Druggist*, 1897, 290.) A mixture of 8 parts of castor-oil and 1 part of oil of pennyroyal, applied to the face and other exposed parts, proves an efficient protective against the bite of mosquitoes.

Mosquitolin. (*Chemist and Druggist*, July, 1896.)

Oil of patchouli	. . . . .	℥x.
Oil of cinnamon	. . . . .	℥x.
Yellow sandalwood	. . . . .	3ss.
Rectified spirit	. . . . .	3vj.
Water	. . . . .	3iv.

Macerate for three days, and filter.

To be used for sponging on the neck and hands.

Formaldehyde as a Remedy for Perspiring Feet. M. Adler. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 843, from *Prag. Med. Wochenschr.*) A weak solution of formaldehyde is applied once daily to the affected parts by means of a brush. After about three days a dry scurf is formed, and the secretion ceases entirely. This effect lasts for about two or three weeks, after which the treatment is repeated. Open sores should first be healed by means of zinc ointment before this remedy is applied, as otherwise the application causes an intolerable burning sensation.

Flexible Iodoform Bougies. (*Pharm. Journ.*, from *Journ. de Pharm. d'Anvers.*) (1) White gelatin, 10; distilled water, 24; glycerine, 32; powdered iodoform, 40; spirit of soap, 2 parts. The basis is melted on the water-bath, the iodoform added, and the liquid aspirated into glass tubes of the requisite diameter, which are then plunged into cold water. (2) Iodoform, $92\frac{1}{2}$; powdered gum arabic, 5; distilled water and glycerine, of each $2\frac{1}{2}$ grammes. Make a homogeneous mass and roll out on a sheet of glass so as to obtain 40 bougies 7·5 centimetres long. Dry at a very moderate temperature. (3) Iodoform, 3 grammes; shredded cacao butter, 2 grammes; powdered gum acacia, 1 gramme; oil of sweet almonds and glycerine, of each 4 drops; distilled water, *q.s.* (2 to 4 drops). Beat into a mass and roll out to the desired length on a sheet of glass, dusted, as requisite, with a little starch powder. Bougies made by this formula remain flexible for some time.

Carbolic Acid Pastilles. H. Salzmann. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 4, from *Apotheker Zeitung.*) Stable and readily soluble pastilles of carbolic acid may be prepared as follows:—95 parts of pure carbolic acid are melted on a water-bath and mixed with 5 parts of stearin soap. Further heat is applied to effect complete solution, and the liquid is then poured into a mortar and briskly stirred with the pestle until a uniform crystalline pasty mass is obtained. This is made into pastilles in the usual manner.

Menthol Pencils. (*Pharm. Zeitung*, xli. 595.) Schimmel & Co. recommend the following formula:—1 part of crystallised menthol and 1 of chloral hydrate are added to a melted mixture of 2 parts of cacao butter and 4 parts of spermaceti, and the whole is then poured into suitable moulds.

Remedy for Sea Sickness. (*Therap. Monatshefte*, 1897, 238. From *Pharm. Journ.*) Mosel-Lavalée recommends the following preparation:—

Menthol	0·1 gramme.
Cocaine Hydrochloride	0·2 „
Alcohol	60·0 grammes.
Syrup	30·0 „

A dessert-spoonful to be taken at intervals of half an hour.

Formula for the Administration of Bromoform. M. F. Gay. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 52.) The author recom-

mends the following emulsion for the administration of this remedy:—

Bromoformii	1·2 gramme.
Ol. amygdal. dulc.	15 grammes.
Gum. arab.	10 „
Syrup. simpl.	30 „
Aq. destill.	65 „

Fiat emulsio.

A tablespoonful of this emulsion contains 0·15 gramme of bromoform.

Creosote Pills. (*Rev. de Thérap. Med. Chirurg.*, lxiii. 157. From *Pharm. Journ.*) Schreiber suggests the employment of dried egg albumin as a pill excipient for creosote, thus:—Creosote, 6 grammes; dried egg albumin, 3 grammes; distilled water, 10 drops. Mix and add powdered liquorice and extract of liquorice, of each sufficient to make a mass. Divide into sixty pills.

Potassium Iodide in Pills. (*Bull. Pharm. de Brux.*, and *Chemist and Druggist.*) Dnyk states that a very good mass is obtained by mixing 10 parts of the powdered iodide with 3 parts of powdered benzoin or olibanum and massing with a few drops of spirit. He has proved experimentally that the pills rapidly dissolve in the stomach.

Chocolate Emulsion of Cod-Liver Oil. (From *Pract. Drugg.*, and *Chemist and Druggist.*)

Irish-moss mucilage, N F.	℥v.
Cod-liver oil	℥viij.
Glycerine	℥ij.
Cocoa-powder	℥j.
Essence of vanilla	℥iij. (or q.s.)

Triturate the cocoa with the mucilage, and heat until a uniform mixture is obtained. When cold, add the cod-liver oil and glycerine, and beat up with an egg-beater.

Nutritive Enemata of Cod-Liver Oil. (From *Pharm. Journ.*) The following formulæ for these preparations for rectal alimentation are given in the *Journal des Practiciens*:—No. 1: cod-liver oil, 5 fluid ounces; yolk of one egg; lime water, 10 ounces. Sufficient for four or five enemata, which may be given during the day. No. 2: cod-liver oil, 5 ounces; yolk of one egg; salt,

40 grains; water, 10 ounces. No. 3: cod-liver oil, 1 pint; gum tragacanth, 35 grains; gum acacia, $1\frac{1}{2}$ ounce; hypophosphite of calcium, 35 grains; lime water to make 40 fluid ounces. From four to six ounces to be used for each injection.

Phosphated Iodo-Tannic Elixir. (*Chemist and Druggist*, from *El Memorandum*.)

Tannin	27 grains.
Phosphate of sodium	90 „
Iodine	$13\frac{1}{2}$ „
Rectified spirit.	5ij.
Dry sherry	5ijss.
Sugar	5ij. 5j.
Water	5ij. 5j.

Dissolve the phosphate in the water, add the sugar, and filter through flannel; dissolve the iodine and tannin in the spirit, add the wine, and filter through paper; then mix the solutions.

Compound Syrup of White Pine. (From *Amer. Journ. Pharm.*)

White-pine bark	65.0 grammes.
Wild-cherry bark	65.0 „
Balm of Gilead buds	8.7 „
Spikenard-root	8.7 „
Sanguinaria-root	6.5 „
Sassafras-bark	4.4 „
Morphine sulphate	0.4 „
Chloroform	4.0 c.c.
Glycerine	150.0 c.c.
Sugar	700.0 grammes.
Water, a sufficient quantity to make	1,000 c.c.

Mix the glycerine with 300 c.c. of water. Having mixed the white-pine bark and other vegetable drugs, reduce them to a No. 40 powder. Moisten the powder with a sufficient quantity of the menstruum, and allow it to macerate for twenty-four hours; then pack it firmly in a cylindrical glass percolator, and gradually pour off the remainder of the menstruum. When the liquid has disappeared from the surface follow it with water, continuing the percolation until 500 c.c. are obtained. Dissolve the morphine sulphate, chloroform, and sugar in the percolate by agitation without heat, strain, and pass enough water through the strainer to make the product measure 1,000 c.c.

Artificial Kissingen Salts. (*Bull. Comm.*, xxiv. 323.)

Potassium chloride	17 parts.
Sodium chloride	357 „
Anhydrous magnesium sulphate	59 „
Sodium bicarbonate.	107 „

These salts should be dried separately and then powdered and well mixed. 7 grammes of this mixture dissolved in a litre of water yield a mineral water containing the chief saline constituents of the Kissingen spring.

Chewing Gums. E. N. Butt. (*Pharm. Journ.*, 4th series, iv. 329.) The author quotes the following recipes for making chewing gums from *Merck's Market Report* :—

1.—Balsam tolu	4 parts.
Benzoin	1 part.
White wax	1 „
Paraffin	1 „
Powdered sugar	1 „

Melt together, mix well, and roll into sticks of the usual dimensions.

2.—Balsam tolu	4 parts.
Resin white	10 „
Paraffin	3 „
Powdered sugar	Sufficient.

Melt the balsam, resin, and paraffin together, and while still fluid incorporate sufficient sugar to make a suitable mass. Roll out with powdered sugar, and cut into pieces.

3.—Balsam tolu	3 parts.
Powdered sugar	1 part.
Oatmeal	3 parts.

Soften the gum on a water-bath, and mix the ingredients; then roll in powdered sugar, and cut into sticks.

4.—Venice turpentine	40 parts.
Common turpentine	30 „
Yellow wax	20 „
Balsam tolu	4 „
Balsam Peru	2 „

Melt together and add in fine powder.

Cinnamon	12 parts.
Chocolate	20
Red sandalwood	4
Sugar	2
Myrrh	2
Galangal	2
Ginger	2
Cardamom	1 part.

Mix, and when sufficiently cool, roll out into sticks or any other desirable form.

5.—Gum chicle	3½ lb.
Paraffin wax	1 lb.
Balsam tolu	2 oz.
Balsam Peru	1 oz.

Dissolve the gum in as much hot water as it will take up, melt the paraffin, and mix all together. Then take—

Sugar	10 lb.
Glucose	4 lb.
Water	3 pints.

Dissolve the sugar and glucose in the water, boil the solution up to the "crack" degree, pour the syrup upon an oil slab, turn into it sufficient of the above gum mixture to make it tough and plastic, incorporate the flavour (powdered cinnamon, chocolate, sandalwood, myrrh, ginger, or cardamom), and, when sufficiently cool, roll into sheets or sticks.

"Chicle gum," referred to in formula No. 5, forms the subject of a long account in which the author deals with the mode of production, history, and uses of this drug (*Pharm. Journ.*, 328, 329). It is stated to be the produce of *Achras sapota*, a tree growing wild in the Yucatan forests and the immediately adjoining States of Central America. It is indigenous to the entire region from Mexico to Guiana, and cultivated in all tropical countries, and is used in the manufacture of chewing gums.

Pastes and Mucilages. (*Chemist and Druggist*, 1897, 200.)

For Painted or Varnished Cans.

(A) Brown sugar	2 lb.
Boiling water	16 fl. oz.
B) French gelatin	4 drs.
Water	4 fl. oz.
(C) Corn flour	12 oz.
Cold water	12 fl. oz.

Beat up and pour the batter into

Boiling water 32 fl. oz.

Continue boiling *C*, if necessary, until the paste is translucent. Dissolve *A* and *B* separately, and then mix with *C*.

The paste should not be too thin, and the tin should be free from grease. The latter may be removed with an alkali or with benzin, but it is better to slightly roughen the surface of the tin with a piece of fine sandpaper where the label is to be placed. This paste is very adhesive, and labels pasted with it will adhere firmly, even in a damp place. The sugar in it renders it proof against cracking when exposed to a dry atmosphere.

To Adhere to Metal.

Powdered gum tragacanth	1 oz.
Powdered gum arabic	4 oz.
Cold water	20 fl. oz.
Glycerine	4 fl. oz.
Thymol	80 grs.
Boiling water	12 fl. oz.

Mix the powders with the thymol, previously powdered; add the glycerine; stir; then add the boiling water, stirring assiduously; finally add the cold water.

Tragacanth Mucilage for Paper.

Powdered tragacanth	1 oz.
Glycerine	4 fl. oz.
Boiling water	16 fl. oz.

Macerate the tragacanth with the glycerine in a glass mortar, then stir the paste into the boiling water.

This makes a very thick mucilage; 32 fl. oz. of boiling water gives a medium, and 64 fl. oz. a thin paste. It is not very adhesive, and may therefore be improved by the addition of pulv. gum acaciæ $\bar{\text{z}}$ ijj.

Household Mucilage.

(<i>A</i>) Powdered gum arabic	3 oz.
White sugar	1 oz.
Boiling water	5 fl. oz.
(<i>B</i>) Dilute acetic acid	1 fl. oz.

Mix *A* with *B*. The acid is added to make the mucilage take hold of the metal.

Dextrin Mucilage.

Yellow dextrin	4 oz.
Distilled water	6 fl. oz.

Dissolve cold, as heat destroys the adhesive properties of dextrin. If a more fluid gum is desired, use 8 fl. oz. of water.

Desiccation of Egg-Albumin. M. Proskauer. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 572.) The desiccation is readily effected by spreading the white of egg thinly over porcelain plates or slabs by means of a brush and allowing to dry in a moderately warm place. A number of incisions are then made extending from the centre to the circumference, when the dried albumin will readily detach itself from the slabs in the form of scales.

Preservation of Grape Juice. W. Müller. (*Apoth. Zeitung.* xi. 724.) The freshly expressed juice is heated in bottles to 70° C, for 15 minutes; it is then filtered and re-heated in clean bottles as before. The product will keep in well-filled bottles for years without any liability to fermentation.

Preparation of Syrup of Strawberries. (*Zeitschr. für Kohlensäure Ind.*) 1000 grammes of sugar are boiled with 600 grammes of water, the solution is strained, mixed with 5 grammes of citric acid, and evaporated to 1,250 grammes. 500 grammes of fresh wild strawberries are now gradually added without crushing the berries, and the mixture is allowed to remain in a covered pan on the water-bath for three hours. It is then strained through flannel, care being again taken not to crush the berries. The bottles filled with the cold syrup are kept in a cool place.

The product is stated to be of very superior flavour.

Tablets for Mouth-Washes. (From *Pharm. Centralhalle.*) L. Bernegau recommends the following formula:—

Heliotropin	0·01 gramme
Saccharin	0·01 „
Salicylic acid	0·10 „
Menthol	1·0 „
Sugar of milk	5·0 grammes
Spirit of rose, sufficient to make 100 tablets.	

Eosin, chlorophyll, or indigo-carmin may be used as colouring agents.

Tooth Soap. D. Frohmann. (From *Therap. Monatsh.*) Thymol., 0·25 gramme; extr. kramer., 1·0 dissolved in 6 grammes of hot glycerine; magnes. ust., 0·5 gramme; sod. bibor., 4 grammes; sapon. med. q.s. ad 30 grammes; ol. menth. pip., 1·0 gramme.

Tooth Powder for Discoloured Teeth. (*Pharm. Journ.*, from *Pharm. Zeit.*) Powdered potassium chlorate, 14 grammes: powdered borax, calcined magnesia, precipitated chalk, of each 28 grammes; oil of peppermint, 10 drops.

Tooth Powder for Tartar. (From *Chemist and Druggist.*)

Saccharin	gr. iij.
Menthol	gr. xv.
Boric acid	ʒss.
Salol	ʒj.
Powdered soap	ʒijss.
Precipitated chalk	ʒv.
Carbonate of magnesia	ʒv.
Essence of peppermint	ʒxxv.
Mix and sift.	

If there is a great deal of tartar, the addition to the above powder of ʒj. of pumice powder to ʒij. is advantageous.

Eucalyptus Tooth Paste. (*Pharm. Post* and *Pharm. Zeit.*) 160 parts of precipitated chalk, 45 of powdered soap, 45 of wheat starch, 1 of carmine, 2 of oil of peppermint, 2 of oil of geranium, 4 of oil of eucalyptus, 1 of oil of cloves, and 1 of oil of anise are mixed and made up into a paste with a mixture of equal parts of glycerine and alcohol.

Toilet and Nursery Powder. (*Pharm. Journ.*, 4th series, iv. 9.)

Boric acid in finest powder	8 ounces.
Oil of petitgrain	2 minims.
Oil of neroli	2 „
Oil of bergamot	2 „
Otto of rose	5 „

If desired this may be coloured pink by the addition of 10 grains of carmine.

Nut-Shell Oil as a Hair-Dye. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 280.) 40 grammes of green walnut-shells are crushed and digested for some time with 10 grammes of alum and a small quantity of water; 200 grammes of the best olive oil are then added, and the mixture is heated on the water-bath until the water has completely evaporated. The oil is then filtered and perfumed with 10 drops of oil of orange flowers, and 5 drops of oil of ylang-ylang. The product is a good brown hair-dye.

Moustache Fixing Fluid. (From *Pharm. Journ.*)

Balsam of tolu	1 part.
Rectified spirit	3 fluid parts.
Jockey Club	1 fluid part.

To be applied with a brush.

Vitellin Cream. L. Bernegau. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 236, from *Pharm. Centralkalle.*) This is a cosmetic preparation consisting of a perfumed mixture of equal parts of yolk of egg, benzoated olive oil, and alapurin.

Yolk of egg may be economically procured for this purpose from the makers of albumin paper, who obtain it as a bye-product.

Shampooing Liquids. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 31.) White Castile soap, 200 parts; alcohol (80 per cent.), 1,000 parts; potassium carbonate, 12 parts. The soap is dissolved in a wide-mouth bottle on the water-bath by constant shaking with the alcohol, and the potassium carbonate is then added. The mixture may be slightly tinted with saffron or rosaniline and then perfumed; after allowing it to stand for several days it is filtered. A very good perfume for this preparation may be obtained by mixing 10 parts of tincture of vanilla, 20 of tincture of orris, 20 of extract of rose, and 50 of extract of orange flowers.

Another formula, proposed by Rodiguët, consists of: 1 part of white Castile soap, 3 parts of alcohol of 85 per cent., 1 part of distilled water, and a sufficient quantity of perfume.

Perfumed Sachets. (*Deutsch. Amer. Apoth. Zeit.*, xvii. 157. From *Pharm. Journ.*) Pieces of fine kid of suitable shape are soaked in a closed vessel for three days in the following solution:—

Oil of bergamot	25 parts.
Neroli oil	20 „
Bitter almond oil	1 „
Oil of orris	40 „
Tolu balsam	30 „
Coumarin	2 „
Rectified spirit	100 „

The pieces of leather should then be dried on a line in a room of the temperature of 17.5° to 20° C. After some days the rough side of the pieces of leather should be painted with gum arabic, and finely pulverised orris root strewn on and again dried. Then

a mixture is prepared of 2 grms. of finely pulverised musk and 2 grms. of civet, and made into a paste with a little gum arabic. This is spread on both sides of the leather and again dried. Two pieces of leather are then stuck together, wound round with wadding, and covered with silk or other fancy material. These sachets will be found to be of lasting perfume and not to give off any dust or powder.

Synthetic Perfumes. (*Pharm. Journ.*, 4th series, iv. 460.)

Lilac.

Ess. jasmin and ess. rose of each .	5 fl. oz.
Ol. ylang ylang	60 minims.
Heliotropin	20 grains.
Ess. tuberosa	10 fl. oz.
Ess. civet	1 drachm.
Terpineol	6 fl. drachms.
Ess. ambrette	1 fl. oz.
Glycerine	4 drachms.
Rectified spirit to	25 fl. oz.

Hyacinth.

Geranyl acetate	3 minims.
Ess. jasmin	10 oz.
Vanillin	10 grains.
Oil Neroli	20 minims.
Hyacinthin	25 „
Ess. ambrette	1 oz.
Coumarin	20 grains.
Ess. rose	3 fl. oz.
Glycerine	4 drachms.
Rectified spirit to	25 fl. oz.

Violet.

Essential oil of orris	5 minims.
Essential oil of sweet orange	1 minim.
Ess. of tuberosa	2 oz.
Ess. of orris	5 „
Oil of lavender	2 minims.
Oil of ylang ylang	10 „
Glycerine	4 drachms.
Ionone	30 minims.
Anethol	2 „
Ess. cassia	4 drachms.
Oil of lignaloes	3 minims.
Heliotropine	10 grains.
Essence of violet to	25 fl. oz.

Perfumes. (*Chemist and Druggist, from Seifenfabrikant.*)*Elder-flower Perfume.*

Terpineol	3ss.
Oil of cananga	3iij.
Oil of rose geranium	℥xxv.
Essence of musk.	℥xxv.
Tincture of storax	5v.
Rectified spirit	3xxxv.
Distilled water	3xvj.

Mix.

Lily-of-the-valley Perfume.

Oil of lignaloes	3liiss.
Oil of cananga	3iij.
Oil of bergamot	3ss.
Oil of rose geranium	℥xxv.
Oil of melissa	℥iv.
Tincture of storax	3iij.
Rectified spirit	3xxxv.
Water	3xvj.

Mix.

New-Mown Hay. (*Zeitschr. des oesterr. Apoth. Ver., xxxv. 31.*)

Ol. bergamot	1·8 grammes.
Ol. rosæ	0·15 "
Ol. flor. aurant.	0·1 "
Ol. lavand.	0·1 "
Ol. caryoph.	0·05 "
Rhiz. iridis flor.	10·0 "
Fab. tonca	5·0 "
Fol. patchouli	0·2 "
Fol. urticæ	2·0 "
Acid benzoic	0·5 "
Vanillin	0·5 "
Spirit. vini	200 "

Florida Water. (*Pharm. Zeitung, xlii. 175.*)

Ol. bergamot	150·0 grammes
Ol. limon.	90·0 "
Ol. aurant. cort.	60·0 "
Ol. lavand.	105·0 "
Ol. caryophyll.	15·0 "
Ol. cinnamom.	15·0 "
Ol. aurant. flor.	15·0 "
Alcohol	18000·0 "
Aq. destill.	4500·0 "

Artificial Violet Essence. (*Chemist and Druggist, November 28th, 1896.*) Schwartz gives the following directions for preparing this artificial essence:—Ten kilogrammes of acetone and 30

grammes of citral are dissolved in 100 kilogrammes of benzol, and to the mixture is added 5 kilogrammes of 10 per cent. solution of sodium ethylate. The mixture is warmed until it assumes a red colour, and set aside for twenty-four hours, when some water is added to it. It is then distilled by a current of steam, and the residue is boiled with 15 parts of 7 per cent. sulphuric acid, allowed to cool, neutralised and distilled. The distillate is a bright yellowish fluid which, in the concentrated state, has an odour of sandalwood, but on dilution has a fine odour of violets.

Artificial Vanilla Essence. (From *Chemist and Druggist*.) Peru balsam, 3j.; oil of orange, 3ss.; essence of violet, 3iv.; Tonka bean, 3ij.; tincture of castor, 30 drops; rectified spirit, 3viiij.; magnesia, 3ijss.; water, 3iv. Mix the balsam and oils with the spirit and magnesia, add the rest of the ingredients; allow to stand for a week, colour with caramel, and filter.

Maraschino Liqueur. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 382.)

	Grammes.
Aq. rubi id.	360·0
Aq. rosæ	48·0
Aq. flor. aurant.	120·0
Aq. amygd. amar. dil.	150·0
Tinct. vanillæ	3·0
Aeth. acetic	0·25
Spirit. vini rect.	400·0
Syrup. simpl.	400·0
Ol. limonis	1 drop.

Baking Powder. C. H. Boehringer. (*Ber. der deutsch. chem. Ges.*, 1896, 709.) The baking powder referred to in this notice consists of a mixture of sodium bicarbonate and acid lactate of calcium.

Black Ink. J. Thornton. (*Chemist and Druggist*, April 10th, 1897.) The following recipe is recommended as yielding an ink quickly made, ready for immediate use and writing with initial and permanent blackness:—

Acid. pyrogallie.	3x.
Ferri sulphat's	3viiij.
Sodii sulphit.	3iv.
Aqua destill. ad.	3xx.

Dissolve the first two ingredients in one-half of the water, and the sulphite in the remainder; then mix. The product may be thickened by the addition of half an ounce of mucilage of acacia.

Black Varnish. (*National Druggist and Chemist and Druggist.*)

Shellac	8 parts.
Resin	5 "
Lampblack	1 "
Alcohol (S.V.M.)	32 "

This makes a shiny black varnish, like japan. If a dead black be required, use the same proportion of ingredients and oil of turpentine instead of alcohol as the solvent.

Water-Tight Varnish for Leather. J. N. Backe. (*Ber. der deutsch. chem. Ges.*, 1896, 821.) Shoe-soles and other leather goods may be rendered water-tight by means of a mixture of common resin, tallow, and turpentine. This is applied by means of a brush and allowed to dry near a fire.

Waterproof Glue. (*Pharm. Centrallhalle*, 1896, 725.) 15 grammes of mastic and the same quantity of sandarac are dissolved in 500 grammes of alcohol mixed with 15 grammes of turpentine. The mixture is heated to the boiling point, and then gradually added, with constant stirring, to a hot concentrated solution of equal parts of isinglass and glue until a thin paste is obtained. The product is strained while hot.

Liquid Glue. (From *Chemist and Druggist.*) 100 parts of glue are softened in 150 parts of water, after which 10 parts of salicylate of soda are added, the mixture being heated in a water-bath until the glue is thoroughly dissolved. 1 drop of oil of cloves is then added to each ounce of the mixture. The salicylate keeps the glue from setting in the pot.

Cement for Amber, Meerschaum, and Ivory. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxiv. 620.) 8 parts of isinglass in thin shreds are softened in water with the addition of a little alcohol, then mixed with 1 part of galbanum, 1 part of ammoniacum, and 4 parts by weight of alcohol; the mixture is then heated, and the solution applied while hot to the surfaces to be cemented.

Cement for Bicycle Tyres. (*Amer. Drugg. and Pharm. Rec.*, 1897, 344.)

(1) Isinglass	$\frac{1}{2}$ oz.
Gutta-percha	$\frac{1}{4}$ "
Caoutchouc	1 "
Carbon bisulphide	4 fl. oz.

Mix and dissolve.

(2) Shellac	2 oz.
Gutta-percha	2 "
Red lead	90 grains.
Sulphur	90 "

Melt the shellac and gutta-percha, and add, with constant stirring, the red lead and sulphur, melted. Use while hot.

(3) Caoutchouc	. . . . .	2 oz.
Resin	. . . . .	140 grains.
Shellac	. . . . .	100 „

Carbon bisulphide, a sufficient quantity to dissolve the other ingredients.

(4) Crude rubber	. . . . .	$\frac{1}{2}$ oz.
Carbon bisulphide	. . . . .	4 „

Macerate twenty-four hours, and then add a solution of—

Resin	. . . . .	1 oz.
Beeswax	. . . . .	$\frac{1}{4}$ „
Carbon bisulphide	. . . . .	$\frac{1}{4}$ „

Puncture Cement.

A recent patented preparation for the automatic repairing of punctures in bicycle tyres consists of glycerine holding gelatinous silica or aluminum hydrate in suspension. Three volumes of glycerine are mixed with one volume of liquid water-glass, and an acid is stirred in. The resulting jelly is diluted with three additional volumes of glycerine, and from 4 to 6 ounces of this fluid are placed in each tyre. In case of puncture, the internal pressure of the air forces the fluid into the hole, which it closes.

Polishing Liquid for Aluminium. (*Zeitschr. des oesterr. Apoth. Ver.*, xxxv. 280.) A good preparation for brightening aluminium is obtained by dissolving 30 grammes of borax in 1 litre of water and adding a few drops of solution of ammonia.

Restoring Tarnished Gold. (*Pharm. Journ.*, from *Jewellers' Circular*.) The following preparation is recommended :—

Sodium bicarbonate	. . . . .	20 oz.
Chlorinated lime	. . . . .	1 „
Common salt	. . . . .	1 „
Water	. . . . .	16 „

Mix well and apply a small quantity with a soft brush.

Non-Arsenical Fly-Paper. (From *Pharm. Centralhalle*.) Pieces of paper of suitable size are saturated with a solution of 5 parts of potassium bichromate and 15 parts of sugar in 60 parts of water, mixed with a solution of 1 part of essential oil of pepper in 10 parts of spirits of wine.

Paraffin-Naphthalin Emulsion as an Insecticide. (From *Pharm. Centralhalle*.) One part of naphthalin is dissolved in 10 parts of

paraffin oil by the application of gentle heat, and the solution violently agitated with a solution of 33 parts of soft soap in 33 parts of water of 85° C. The emulsion thus obtained is very permanent. A mixture of 15 parts of this emulsion with 1,000 parts of water is recommended as a very efficient insecticide.

Insecticide for Plant Lice. (*Rev. Méd. Pharm.*, iii. 301.) Six parts of quassia wood, $2\frac{1}{2}$ of salicylic acid, and 20 of soft soap are macerated for several days with 200 parts of methylated spirit. The product is then diluted with water and applied to the infested parts with a brush. The next day the plants thus treated are washed with a good spray of water.

Fertilising Mixtures. (*Rev. Chim. Ind.*, and *Canad. Pharm. Journ.*, from *Pharm. Journ.*) *For Gardens.*—Ammonium sulphate, 10; sodium nitrate, 15; ammonium phosphate, 30; potassium nitrate, 45 parts. *For Lawns.*—Potassium nitrate, sodium nitrate, calcium sulphate, and calcium superphosphate, equal parts. *For Fruit Trees.*—Potassium chloride, 10 parts; potassium nitrate, 50 parts; potassium phosphate, 57 parts.

CHEMICAL GUANO.—Calcium nitrate, 100; potassium nitrate, 25; potassium phosphate, 25; magnesium phosphate, 25 parts. Dissolve a teaspoonful in a quart of water, and apply to each pot once or twice a month. The plants must be in full vegetation.

Mercuric Chloride for the Prevention of Potato Disease. (*Journ. Soc. Chem. Ind.*, xv. 917.) For some years past a mercury bichloride solution has been used at Ciphy as a preventive of the ravages of *Peronospora infestans*. A 0.015 per cent. solution of the mercury salt is prepared, the liquid being coloured by 0.24 per cent. of copper sulphate. In this mixture the seed potatoes are steeped for about five minutes, and then thrown into heaps for planting. Immunity from the disease is the result. The germination of the plants is accelerated and the seed tubers are better preserved in the ground. Immersion of the tubers for fifteen days in a solution of double the above strength did not retard germination. For preserving the leaves of the growing plant from infection by the spores of *Peronospora* the following mixture will be found useful:—100 kilos of quicklime are slaked with about one-third by weight of water containing 200 grammes of copper sulphate per litre, the mixture being sprayed in the dry state over the plants at the rate of 250 kilos per hectare, after the disease has become fully apparent in neighbouring fields. The powder adheres strongly to the leaves and will withstand a week's rain.

TRANSACTIONS
OF THE
British Pharmaceutical Conference
AT THE
THIRTY-FOURTH ANNUAL MEETING
AT
GLASGOW.
1897.

C O N T E N T S.

CONSTITUTION AND RULES OF THE CONFERENCE.

ALPHABETICAL LIST OF MEMBERS' NAMES AND ADDRESSES.

PROGRAMME OF TRANSACTIONS OF THE CONFERENCE AT GLASGOW,
1897, INCLUDING TITLES OF PAPERS.

THE TRANSACTIONS OF THE CONFERENCE, INCLUDING THE PAPERS READ
AND DISCUSSIONS THEREON.

GENERAL INDEX TO THE YEAR-BOOK AND TRANSACTIONS.

British Pharmaceutical Conference.

CONSTITUTION.

Art. I.—This Association shall be called The British Pharmaceutical Conference, and its objects shall be the following :—

1. To hold an annual Conference of those engaged in the practice, or interested in the advancement, of Pharmacy, with the view of promoting their friendly reunion, and increasing their facilities for the cultivation of Pharmaceutical Science.
2. To determine what questions in Pharmaceutical Science require investigation, and when practicable, to allot them to individuals or committees to report thereon.
3. To maintain uncompromisingly the principle of purity in Medicine.
4. To form a bond of union amongst the various associations established for the advancement of Pharmacy, by receiving from them delegates to the annual Conference.

Art. II.—Membership in the Conference shall not be considered as conferring any guarantee of professional competency.

RULES.

1. Any person desiring to become a member of the Conference shall be nominated in writing by a member, and be balloted for at a general meeting of the members, two-thirds of the votes given being needful for his election. If the application be made during the recess, the Executive Committee may elect the candidate by a unanimous vote.

2. The subscription shall be 7s. 6d. annually, which shall be due in advance upon July 1.

3. Any member whose subscription shall be more than two years in arrear, after written application, shall be liable to be removed from the list by the Executive Committee. Members may be expelled for improper conduct by a majority of three-fourths of those voting at a general meeting, provided that fourteen days' notice of such intention of expulsion has been sent by the Secretaries to each member of the Conference.

4. Every association established for the advancement of Pharmacy shall, during its recognition by the Conference, be entitled to send delegates to the annual meeting.

5. The Officers of the Conference shall be a President, four Vice-presidents by election, the past Presidents (who shall be Vice-presidents), a Treasurer, two General Secretaries, one local Secretary, and nine other members, who shall collectively constitute the Executive Committee. Three members of the Executive Committee to retire annually by ballot, the remainder being eligible for re-election. They shall be elected at each annual meeting, by ballot of those present.

6. At each Conference it shall be determined at what place and time to hold that of the next year.

7. Two members shall be elected by the Conference to audit the Treasurer's accounts, such audited accounts to be presented annually.

8. The Executive Committee shall present a report of proceedings annually.

9. These rules shall not be altered except at an annual meeting of the members.

10. Reports on subjects entrusted to individuals or committees for investigation shall be presented to a future meeting of the Conference, whose property they shall become. All reports shall be presented to the Executive Committee at least fourteen days before the annual meeting.

* * * Authors are specially requested to send the titles of their Papers to The Hon. Gen. Secs. Brit. Pharm. Conf., 17, Bloomsbury Square, London, W.C., two or three weeks before the Annual Meeting. The subjects will then be extensively advertised, and thus full interest will be secured.

FORM OF NOMINATION.

I Nominate

(Name)

(Address)

as a Member of the British Pharmaceutical Conference.

..... Member.

Date

This or any similar form must be filled up legibly, and forwarded to The Asst. Secretary, Brit. Pharm. Conf., 17, Bloomsbury Square, London, W.C., who will obtain the necessary signature to the paper.

Pupils and Assistants, as well as Principals, are invited to become members.

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BOURNEMOUTH.—Chemists' Association. Mr. Stewart Hardwick, 21, Commercial Road, Bournemouth.

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OF THE

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AT THE

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 LEIGH, PETER, Rothsay.
 M'FIE SMITH, G., Glasgow.
 M'ADAM, R. (*Chairman*), Glasgow.
 M'GREGOR, ADAM, Ayr.
 M'KELLAR, A., Glasgow.
 M'ILLAN, JOHN, Glasgow.
 M'CURRAY, J., Helensburgh.
 M'NEVEN, J., Falkirk.
 MILLER, ALEX., Glasgow.
 MILLER, J. W., Glasgow.
 MOTT, JAMES, Glasgow.

NIEL, JOHN, Glasgow.
 PATERSON, ARCH., Glasgow.
 PATON, JAS. F.L.S., Glasgow.
 ROBERTSON, DR. A. M., Glasgow.
 ROBERTSON, D. R., Rutherglen.
 ROBERTSON, GEO., Glasgow.
 RUSSELL, J. ANDERSON (*Secretary*),
 Glasgow.
 SMITH, JOHN, Alexandria.
 STAFFORD, E.C.C., J.P. F.I.C., Dal-
 mair.
 STEWART, JOHN, Hamilton.
 SUTHERLAND, J. W., Glasgow.
 TAYLOR, D., Motherwell.
 TAYLOR, JOHN, Glasgow.
 TUCKER, ROBERT, Maybole.
 WALKER, JOHN (*Treasurer*), Glasgow.
 WALLACE, M., Glasgow.
 WALLACE, W., Glasgow.
 WATSON, D., Glasgow.

THE SITTINGS OF THE CONFERENCE WERE HELD IN THE
HALL OF THE GRAND HOTEL, GLASGOW,
 ON TUESDAY & WEDNESDAY, AUGUST 10 AND 11, 1897,
 Commencing at Ten a.m. each day.

MONDAY, 9th AUGUST.

The EXECUTIVE COMMITTEE met, according to notice from the Honorary General Secretaries, at 7 p.m., at the Grand Hotel, Glasgow.

TUESDAY, 10th AUGUST.

The CONFERENCE met at 10 a.m., adjourning at 1 p.m.; and at 2 p.m. adjourning at 3.30 p.m.

Order of Business.

Address of Welcome by the Honourable the Lord Provost.
 President's Address.
 Reception of Delegates.
 Report of the Executive Committee.
 Financial Statement.
 Report of the Treasurer of the "Bell and Hills Library Fund."
 Report of Unofficial Formulary Committee by W. Martindale, F.C.S.
 Reading of Papers and Discussions thereon.

PAPERS.

1. *Note on the Word "Asafetida."* By PROFESSOR JOHN ATTFIELD, Ph.D., F.R.S.
2. *Further Note on the "Pharmacy of Conium Maculatum."* By E. H. FARR, F.C.S., and R. WRIGHT, F.C.S.
3. *Preliminary Note on the Action of Certain Preparations and Active Principles of Conium Maculatum.* By WM. FINDLAY, M.A., M.B.
4. *Some Observations on Organotherapy.* By J. C. MCWALTER, L.R.C.S.I., L.A.H.I., M.P.S.I.
5. *Further Observations on Commercial Oil of Citronella.* By J. C. UMNEY, F.C.S., and R. S. SWINTON.
6. *The Pharmaceutical Value of Sumatra Benzoin.* By THOMAS DUNLOP, Ph.C.

There was a mid-day adjournment between 1 and 2 p.m. for luncheon at the Grand Hotel.

In the afternoon, after the adjournment of the Conference, there was an Excursion to Loch Lomond. The party left Charing Cross by special train, passing through several places of interest on their way to Balloch. Here they embarked on the steamer in waiting, and a most pleasing and enjoyable cruise round the Loch then followed, amid magnificent and picturesque scenery. The return journey was made by special train, *via* Balloch, and although the latter part of the excursion was accompanied by rain, it was one of the great successes of the Glasgow Meeting.

WEDNESDAY, 11th AUGUST.

The CONFERENCE met at 10 a.m., adjourning from 1 till 2 p.m. The whole of the business of the Conference was completed this day at 3.45.

Order of Business.

Reception of Delegates.

Reading of Papers and Discussions thereon.

PAPERS.

7. *Note on some Soluble Compounds of Arsenic.* By PROFESSOR HENDERSON, M.A., D.Sc.
8. *Pharmaceutical Ethics—A Retrospect.* By LEO ATKINSON, Ph.C.
9. *Note on Syrupus Ferri Quininae et Strychninae Phosphatum (Easton's Syrup).* By R. BRODIE, Ph.C.
10. *Hypophosphites.* By CHARLES THOMAS TYRER, F.C.S.
11. *Medicinal Petroleum.* By F. C. J. BIRD.
12. *The Salient Features of the Scottish Flora.* By G. C. DRUCE, M.A., F.L.S.
13. *Note on the Strength of Commercial Samples of Alkaloidal Tinctures.* By CLARENCE A. SEYLER, B.Sc., F.I.C.
14. *Phosphates and Platinum.* By W. G. STRATTON.
15. *Liquor Bismuthi et Ammonii Citratis.* By W. G. STRATTON.
16. *Disinfectant Soaps.* By S. RIDEAL, D.Sc., F.I.C., F.C.S., F.G.S.
17. *Our Present Knowledge of the Mydriatic Group.* By GORDON SHARP, M.D., etc.

Presentation from Bell and Hills Fund.

Election of Formulary Committee.

Place of Meeting for 1898.

Election of Officers for 1897-98.

There was a mid-day adjournment between 1 and 2 for luncheon at the Grand Hotel.

In the forenoon of this day there was a drive through part of the City and some of the Parks, which was much appreciated by the ladies.

After the conclusion of the Conference Sitzings:—

At 3.45 p.m. tea was provided at the Grand Hotel, followed at 4.30 p.m. by a pleasure drive to the Glasgow Waterworks at Mydock. At 8.30 p.m. a Ladies' Drawing Room and a Smoking Concert were held simultaneously at the Grand Hotel. Both were largely attended and greatly enjoyed.

THURSDAY, 12th AUGUST.

Day's cruise on Firth of Clyde, Western Lochs, and through the Kyles of Bute.

BRITISH PHARMACEUTICAL CONFERENCE.

MEETING AT GLASGOW, 1897.

The Thirty-fourth Annual Meeting of the British Pharmaceutical Conference commenced its sittings on Tuesday, August 10th, in the Hall of the Grand Hotel, Glasgow, Dr. C. Symes, Ph.C., in the chair.

The following members and friends were present during the meeting :—

Aberdeen—Craig, A., junr.; Cruickshank, J.; Johnston, J.; Ritchie, D.; Wier, A. S.

Alexandria—Smith, J.

Arbroath—Jack, J.; Naysmith, Mr. and Mrs. A. W.

Arkansas—Hunt, L. J.

Ashby de la Zouche—Bullen, G. W.

Atherstone—Parkinson, F. W.

Ballymoney—Baxter, J.

Bedlington—Foggan, Mr. and Mrs. Geo.

Belfast—Gibson, S.; Hogg, S.; McKnight, R. W.

Birmingham—Gibbs, R. D.; Jarvis, C. F.; Perry, G. E.

Blackrock—Grimes, Henry.

Bournemouth—Bilson, F. E.; Bridge, G. E.; Toone, J. A.

Bridge of Allan—Bain, John.

Brighton—Savage, G.; Savage, Miss L. W.; Savage, W. W.; Yates, C. G.

Campbelton—Watson, M. M.

Cardiff—Hicks, W. S.

Carlisle—Hinksman, J.

Conway—Williams, W. G.

Dalkey—Beggs, G. D.

Dalmuir—Stanford, E. C. C.; Stanford, Miss Alice.

Dartford—Williams, Mr., and Mrs. W. Lloyd.

Durban, Natal—Champion, G. A.; Champion, H. L.; Champion, Miss Edith G.

Dublin—Conyngham, H.; Kelly, P.; McWalter, J. C.; Walsh, J. A.; White, J.; Wells, W. F., junr.

Dumbarton—Bath, J.; Mitchell, P.

Dumfries—Johnstone, W. G.; Laurie, W. J.

Dundee—Anderson, A. B.; Anderson, M.; Cummings, C.; Ferrier, D. H.; Kerr, Charles; Russell, J.

Dunfermline—Fisher, Mr. and Mrs. J. H.

Edinburgh—Boa, Mr. and Mrs. P.; Bowmont, W. L.; Brown, D. R.; Coats, Mr. and Mrs. J. T.; Ewing, J. L.; Fisher, W.; Harkness, Mr. and Mrs. J.; Hendry, R. L.; Henry, C. F.; Hill, J. Rutherford; Laird, G. H.; Lunan, Mr. and Mrs. G.; McKenzie, J.; McLaren, D.

Exeter—Gadd, H.; Lake, J. E.; Lake, J. H.

Exmouth—Toone, Arthur H.

Glasgow—Adam, Thomas; Blair, T.; Boyd, A.; Brodie, R.; Carmichael, M.; Currie, Mr. and Mrs. W. L.; Currie, Master J.; Dunlop, T.; Foster, Mr. and Mrs. J.; Frazer, F. L.; Frazer, S. M.; Greig, W.; Halley, J. M.; Hatrick, W. L.; Hoseason, J. H.; Kitchin, G. S.; Laing, A.; Lambie, H.; Laurence, J.; Law, Mr. and Mrs. W. J.; Ling, W. J.; McAdam, Mr. and Mrs. Robert; McAdam, A. Milne; McAdam, Miss; McKellard, A.; McMillan, A.; McMillan, D. M.; McMillan, Mr. and Mrs. J.; Miller, J. W.; Miller, Miss A.; Moir, D.; Moir, Jas.; Neil, J.; Ramsay, J. A.; Robb, J.; Robertson, A. M.; Russell, J. Anderson; Schmidt, A.; Sutherland, J. W.; Taylor, W. B.; Walker, Mr. and Mrs. John; Wallace, W.; Watson, Miss Annie; Watson, D.; Watson, Robert.

Greenock—Kerr, Mr. and Mrs. James; Lees, David.

Hawick—Maben, Thos.

Helensburgh—Harvey, N. T.; McMurray, J.; McMurray, Peter B.; McMurray, Miss.

Hendon—Goldfinch, G.

Hitchin—Ransom, Mr. and Mrs. Francis.

Kirkcaldy—Allen, Mr. and Mrs. H. W. F.; Storrar, David.

Kirremuir—Ford, James; Ford, Jessie.

Leeds—Ward, G.

Leicester—Butler, E. H.

Leith—Bowman, J.; Coull, Mr. and Mrs. George.

Leven—Hogg, Andrew.

Liverpool—Bain, Mr. and Mrs. J.; Buck, A. S.; Cowley, R. C.;

Hudson, Thos. H.; Newton, John; Smith, John; Smith, W. R.; Symes, Dr. C.; Symes, Mrs.; Wardleworth, Theo. H.

London—Allen, C. B.; Arkinstall, W.; Atkinson, Mr. and Mrs. Leo.; Bascombe, F.; Bird, F. C. J.; Bourdas, J.; Bourdas, I.; Bourdas, Miss E.; Bowen, J. M.; Bremridge, R.; Buckman, T. F.; Cave, H. B.; Clarke, Goddard; Collier, H.; Dyson, Mr. and Mrs. W. B.; Emerson, Mr. and Mrs.; Hayles, H. B.; Hills, Walter; Holmes, E. M.; Humphry, John; Hustler, W.; Idris, Mr. and Mrs. T. H. W.; Idris, Miss; MacEwan, P.; Mathews, J. H.; McAdam, Mrs. N.; Merrin, A. C.; Moss, John; Naylor, W. A. H.; Nead, Mr. and Mrs. C. C.; Nightingale, J. C.; Paul, Benj. H.; Pettinger, Mr. and Mrs. E.; Reeve, A.; Robinson, Mr. and Mrs. R. A.; Robinson, W. Prior; Sangster, Arthur; Shaw, Mr. and Mrs. John W.; Stanford, Miss Alice; Tyrer, Thomas; Turner, A. E.; Umney, C. E.; Umney, Mr. and Mrs. John C.; Want, W. P.; Warren, W.; Weston, T. J.; Weld, Mr. and Mrs. C. C.; Wink, J. A.; Wink, Mr. and Mrs. J. G. S.; Wood, D. H.; Wright, T. R.

Malta—Warwick, F.

Manchester—Clementi, Miss; Cooper, Miss M.; Cooper, Mr. and Mrs. F. R.; Johnstone, C. A.; Lawton, Mrs.; Pidd, A. J.; Wild, Mr. and Mrs. J.

Mansfield—Vallance, Arthur C.; Vallance, Miss Maud M.

Maybole—Tocher, R.

Merthyr Tydvil—Harris, E. W.

Monksheaton—Procter, C. A.

Montrose—Davidson, A.

Motherwell—Taylor, D.

New Burnett—Young, R. Fisher.

Newcastle—Johnson, R. A.; Martin, Mr. and Mrs. N. H.; Martin, Misses; Merson, G. F.; Proctor, W. H.; Sharp, W.

Northallerton—Fairburn, H.

Northwich—Humphreys, G.

Nottingham—Bolton, C. A.; Gill, W.

Oxford—Druce, G. Claridge; Mathews, Henry.

Paisley—Frazer, Alexander.

Partick—Rait, R. C.; Robertson, Mr. and Mrs. G.

Perth—Harley, P. T.; Miller, Miss Annie.

Peterhead—Tocher, J. F.

Philadelphia—Kline, Mrs. and Mrs. M. N.; Remington, Joseph P.

Portobello—Nesbit, John; Nesbit, Miss M. A. L.; Nesbit, H.

Rothsay—Leith, Peter.

Rutherglen—Robertson, R. L.

Settle—Shepherd, Mr. and Mrs. J. W.

St. Andrews—Kermath, William R.

Stirling—Jackson, Mr. and Mrs. J. C.

Stockton-on-Tees—Clarke, W. J.

Streatham—Shacklock, J. W.

Swansea—Grose, N. M. ; Hughes, J. ; Seyler, Clarence A.

Twerton—Robson, T. W.

Tunbridge Wells—Hobbs, A. E. ; Hobbs, Frank H.

Waterloo—Alexander, J. ; Pearson, W.

Watford—Attfield, Dr. John.

Whiteley—Sharp, Mrs.

Wigan—Johnson, Miss E. ; Johnson, T.

MEETING OF THE EXECUTIVE COMMITTEE.

A meeting of the Executive Committee was held at the Grand Hotel on Monday, August 9th, at 7 p.m.

Present:—Dr. C. Symes (President), in the chair, Dr. Attfield, Messrs. Atkins, Ewing, Hills, Martin, McAdam, and Wells (Vice-Presidents), Messrs. Bird, Coull, Foster, Holmes, Russell, J. C. Umney, and Wardleworth, J. Anderson Russell (Hon. Local Secretary), Mr. John Moss (Hon. Treasurer), Messrs. Naylor and Ransom (Hon. Gen. Secretaries), and Mr. J. C. Nightingale (Assistant Secretary).

The minutes of the previous meeting were read and confirmed.

The Treasurer's Financial Statement for the year ending June 30th, 1897, was read and approved.

A draft report of the Executive Committee for presentation to the annual meeting was submitted by the Hon. General Secretaries and agreed to.

A proposed list of officers for the ensuing year was adopted for recommendation to the general meeting for election.

The place of meeting for 1898 was considered, and it was announced that a cordial invitation from Belfast would be offered at the General Meeting.

A revise of programme of the business of the Annual Meeting was laid on the table and approved.

It was unanimously agreed that Mr. D. Hooper, F.C.S., be invited to act as Honorary Colonial Secretary for Bengal in place of Dr. Kernot, of Calcutta, deceased.

The following thirty-six gentlemen having been duly nominated were elected to membership:—

Adam, T., Glasgow.	Lyons, P. J., Belfast.
Allan, H. W. F., Kirkcaldy.	Lyttle, W., Belfast.
Amoore, A. S., London.	McDonald, D. B., Glasgow.
Blair, T., Partick.	McWalter, J. C., Dublin.
Brindle, E., Edinburgh.	Mitchell, D., Inverness.
Brodie, Demerara.	Moir, J., Glasgow.
Bruce, A. G., Edinburgh.	Nance, W. de, Glasgow.
Champion, G. A., Natal.	Neil, J., Glasgow.
Clotworthy, S., Belfast.	Newton, J., Liverpool.
Cowper, D. B., Edinburgh.	Proudfoot, W., Glasgow.
Cussons, J. W., Ossett, Yorks.	Rankin, W. J., Belfast.
Dalziel, C. M., Carlisle.	Reeve, A., London.
Gibson, S., Belfast.	Robertson, D. S., Glasgow.
Jarvis, C. F., Birmingham.	Stratton, W. G., Uckfield.
Kears, H. P. J., Brighton.	Tollitt, W., Worthing.
Kermath, W. R., Glasgow.	Walker, J. D., Edinburgh.
Kitchin, G. S., Glasgow.	Whittle, J., Morpeth.
Lothian, J., Glasgow.	Yates, C. G., Brighton.

GENERAL MEETING.

Tuesday, August 10th.

The thirty-fourth Annual Meeting of the British Pharmaceutical Conference commenced its sittings on Tuesday, August 10th, in the large and commodious hall of the Grand Hotel, Glasgow, Chas. SYMES, Ph.D., President, taking the chair at ten o'clock.

In opening the proceedings, he said they were honoured by the presence of the Lord Provost of Glasgow, who had come at some sacrifice, being a very busy man, to welcome the Conference. They were already indebted to him and the municipal authorities for their kindness in placing at the disposal of the Local Committee the beautiful Art Gallery, in which they had met on the previous evening, although he understood that a much finer building was about to be erected as a home for the art treasures which the city possessed.

The LORD PROVOST said he came that morning with very great pleasure, but besides that he felt that it was a duty on the part of the municipality to offer a cordial welcome to the ladies and gentlemen, who had come from considerable distances to the City

of the West. He hoped they would be able to see not only the beauties of Glasgow itself, but of the surrounding district, for he was proud to say, after having travelled in many parts of the world, that within a radius of forty or fifty miles of that city would be found as beautiful scenery as he had ever seen. He came, however, not to speak for the country district, but for the city, which, through him, gave an open-hearted welcome to the Conference. He understood that the Association existed for the purpose of encouraging research in the highly scientific profession in which they were engaged, and also a friendly feeling amongst those who were engaged in it. It had been his duty and pleasure to welcome many similar conferences, but never did he with more pleasure than on the present occasion. He could imagine nothing more conducive to good feeling and the advancement of science than such annual meetings held in various parts of the country, and he was pleased to see that they did not confine themselves to reading scientific papers, but included a little recreation in the programme. He found it was twenty-one years since the Conference last visited Glasgow, and he hoped that any members who had been present on the former occasion would feel that they received quite as hearty a welcome now as they did then. He also hoped that so long an interval would not again elapse before the next visit. The programme sketched out was admirable, including Loch Lomond, one of the most beautiful lakes in the world, and the water-works, of which the city was proud, and he only wished there had been time to examine carefully the whole of those magnificent works. At any rate, he thought they would be satisfied with the purity of the Loch Katrine water. If there were anything he could do to make their stay in Glasgow more comfortable they had only to mention it. He was glad to hear that the members had enjoyed their visit to the Art Galleries, though, as the President had said, the residents were not satisfied with them, and a more suitable building was about to be erected, of which H.R.H. the Duke of York would shortly lay the memorial stone. He hoped that at their next visit the Conference would find that building completed, and furnished with a still finer collection of pictures than they at present possessed. He concluded by again tendering a hearty welcome to the Conference.

The PRESIDENT said that although the Lord Provost had come there at a great sacrifice of his valuable time, he had extended to the Conference a very hearty welcome. It was a great thing that in a city like Glasgow, the commercial capital of Scotland, they

were not utterly utilitarian. There was always a great tendency with people engaged in business in a particular direction to become one-sided, but the people of Glasgow spent their money and their thoughts on art and literature, and cultivated the sentimental side of their nature as well as the practical side. Glasgow might well feel proud of its water supply, and they might all be assured that the water was healthful.

A vote of thanks to the Lord Provost for his welcome was received with acclamation and briefly acknowledged.

DISTINGUISHED VISITORS.

The PRESIDENT then referred to the presence of Professor Remington of Philadelphia, and Mr. Champion, President of the Pharmaceutical Society of Natal. Professor Remington was the author of very excellent works on Pharmacy, and had for many years been the Professor of Pharmacy at the Philadelphia College. The pharmacists of this country seemed to have an especial interest in that College, which was a pioneer institution, and had always boasted of excellent men who had distinguished themselves in the profession of pharmacy. It was a curious thing that in their own School at Bloomsbury Square until comparatively a few years ago, the art of pharmacy had not been taught.

Mr. N. H. MARTIN said: In every country where pharmacy is known the name of Professor Remington is as a household word. I have had the pleasure and honour of receiving the hospitality of American pharmacists in general, and of Professor Remington in particular. The Philadelphia College is the oldest school of pharmacy, and without exception it has done more to disseminate the love of pharmaceutical science, and has sent out to the world more men imbued with that love, than any other school in existence. The mantle of Proctor and of Parrish has fallen on Remington, and Remington has very nobly borne that burden. He is to-day the main support of his school. With regard to his works, Parrish's book was the one I studied many years ago with a considerable amount of interest; but that work has now been superseded by Remington's own book. I have very great pleasure in supporting this welcome which we accord to Professor Remington on this occasion.

Professor REMINGTON, on rising, was received with hearty cheers. He said: I cannot say how much my heart has been touched by this most hearty welcome. I have had the pleasure of

meeting a great many of the members of this Conference individually and personally, but to thus meet you all in assembly has been one of the events I have looked forward to for many years. It was very good of you to say the kind words about me that you did, and I must say here and now that I do not deserve half the good things you have said; and I am sure if my wife were here she would say I do not deserve a tenth. I notice many married men here, and you know how that is. Eleven years ago I had the very great pleasure of coming to Great Britain for the first time in my life, and to feel that almost every door was opened to me, to feel hands stretched out on all sides. I had an idea of the hospitality of the old country that I shall never forget. I may say for myself just a word or two personally. I am an American; my ancestors were English on both sides of the house, and I feel that I can speak the English tongue fluently. Of course there are a few matters of detail that I have not acquired yet. You will notice in my speech that I have not acquired the broad "a" and that tone which is supposed to mark the true Englishman. I can say I am an American, therefore you must take me for what I am, and any little errors of speech you will kindly look over and consider my birthplace. I was so glad to hear the Lord Provost say a good word for water. Water, you know, is the backbone of the pharmaceutical profession. When I came to Glasgow I thought there was nothing but whisky. To hear that good word for water—well, it went home. I quite shocked the waiter this morning by calling for water, which I take diluted with ice. He looked very much surprised, as if that were a thing totally unknown. I thank you, Mr. President, for your warm words of welcome.

The PRESIDENT said Mr. Champion had come a long way to attend the meeting. Mr. Champion was President of the Pharmaceutical Society in a country where pharmacy had not advanced to the extent it had in the United States, but he had no doubt that in due course Natal would have a pharmaceutical society of which they would all be proud. He would call upon Mr. Walter Hills, the President of the Pharmaceutical Society of Great Britain, to welcome Mr. Champion.

Mr. WALTER HILLS, in welcoming him, said that Mr. Champion was the first President of the Natal Board of Pharmacy, and was specially interested in the examination work of that body. As he had been called upon quite unexpectedly to speak for Mr. Champion, he thought it would be better to leave Mr. Champion to speak for himself.

Mr. CHAMPION said it was an unexpected pleasure to have the opportunity of thanking the members of the Pharmaceutical Conference and other gentlemen connected with pharmacy for the kindness and courtesy shown him in London. Up to quite recently the position of chemists in Natal had not been satisfactory, the Examining Board which granted certificates, consisting of medical men only, who were often somewhat rusty in their pharmacy, and naturally the candidates slipped through very easily. A Bill was therefore introduced about three years ago through the instrumentality of the Chemists' Society of Natal, which provided for the formation of a Pharmacy Board to consist of five chemists and one member of the Medical Council. Of the five chemists two were appointed by the Government, and three were elected by the chemists in the colony. The Bill was passed, and came into operation last year, the first meeting of the Board being held in November last. As he was making a visit to England with his family this year to witness the Jubilee rejoicings, he took the opportunity of visiting Bloomsbury Square, and getting some insight into the mode of conducting the examinations. Of course it would be premature at present to expect the examinations in Natal to attain such perfection, but he hoped as time went on they would be able to place their examinations on a par with those in Great Britain, and that they might be able to claim reciprocal recognition of their certificates. He concluded by again thanking British pharmacists for the kindness and courtesy they had shown him on every hand.

The PRESIDENT then delivered his address :—

PRESIDENT'S ADDRESS.

Ladies and Gentlemen,—Men of all conditions, societies of all denominations, communities of every description in the British Empire and its dependencies, have, during the present year, been celebrating the Diamond Jubilee of Her Majesty the Queen. In so doing, retrospective views have been taken of the growth and progress of science, art, literature, professions, and commerce during this record reign. The tendency in the present rapidly progressive age is to rush forward at a pace which leaves little opportunity for reflection, for looking back on the experiences of

the past and endeavouring to find therein some solution of the difficulties which beset us in the present, or suggestions to assist us in developments for the future. The maxim, "Experientia docet," so often on our lips, finds little that corresponds therewith in our lives, and we are prone to forget the experiences of the past and the lessons which they would so readily teach. Then there is a certain amount of satisfaction and encouragement in reviewing the history of an institution, planned and developed by men of intellect and ability, many of whom are no longer with us, but whose works survive them and bear fruit, which it is our privilege to gather if we will. On the present occasion, therefore, I feel that it will harmonize with our environment, help us to realize our indebtedness, and stimulate us to greater zeal, if we look back at the past of our association, not, it is true, for sixty years, but from its birth in 1863.

THE ORIGIN OF THE B.P.C.

Several years previous to that date the late Mr. Schacht advocated "that for the best interests of the pharmacy of England it was expedient that the annual meetings of the Pharmaceutical Society should be held not always in one fixed place, but in rotation at the various towns of importance where its members reside."

This idea, after lying dormant until May, 1863, was enlarged upon by Mr. Richard Reynolds in an article published in the *Pharmaceutical Journal*, headed "Systematic Scientific Enquiry," in which he referred to the meetings of the American Pharmaceutical Association and the useful work it was doing, and suggested the meeting which subsequently took place at Newcastle. Although there was at first some hesitancy as to forming a distinct organisation which might detract from the interest felt in and the work being accomplished by the parent Society in England, it was soon felt that there would be abundant scope for both institutions, and some of the active members of the Society became the founders of the Conference.

A number of the leading pharmacists of that day, zealous for the good of pharmacy, desirous of doing something of permanent good for the calling they had chosen, self-denying and devoted to the cause, met at Newcastle-on-Tyne to inaugurate the British Pharmaceutical Conference, to formulate the objects for which it should work and the conditions under which its operations should be carried on.

The functions decided upon were these:—

1. To hold an annual conference of those engaged in the practice, or interested in the advancement, of pharmacy, with the view of promoting their friendly reunion, and increasing their facilities for the cultivation of pharmaceutical science.
2. To determine what questions in pharmaceutical science require investigation, and when practicable, to allot them to individuals or committees to report thereon.
3. To maintain uncompromisingly the principle of purity in medicine.
4. To form a bond of union amongst the various associations established for the advancement of pharmacy by receiving from them delegates to their annual conference.

HOW THE OBJECTS HAVE BEEN ACCOMPLISHED.

Now let us consider how far these objects (which, I am sure, every one will admit are admirable) have so far been accomplished. On thirty-three annual occasions, exclusive of the present, have those interested in the advancement of pharmacy been called together in twenty-nine important centres, bringing members resident in those various localities into closer contact with each other than had been their custom, and often establishing friendships where estrangement previously existed. In some instances new local associations have been formed, and although this does not mean that on every occasion they have grown and flourished, the good seed has been sown, and more or less enthusiasm has been created. But the development and maintenance must necessarily depend on local effort. Then, more general fraternising influence is felt, and is so fully appreciated by us all that it scarcely needs mention. The "friendly intercourse" part of the programme must be regarded as an undoubted success. Some 700 papers have been read and discussed, all of deep interest, and many the result of much labour and research. The Conference has always fostered investigations, and often made money grants to promote research, the results of which have not been for the personal aggrandisement or pecuniary interest of individuals or for the benefit of the Conference itself but have been made free to all. The *Year-Books of Pharmacy* before you, containing as they do reports of the progress of pharmacy at home and abroad year by year, are valuable to every member of our craft, and those who do

not obtain these volumes and peruse them lose much, not only intellectually but pecuniarily. The *B.P.C. Formulary* has become a recognised work; some medical men use it regularly in their prescribing, and I trust that before long many more will do so. It has done away with that anomalous condition of things in which valuable drugs, cropping up during the intervals which occur between the various editions of the Pharmacopœia, were prepared in various ways and of various strengths, so that a prescription dispensed in different localities, or even by different pharmacists in the same locality, may have differed widely in character and strength. It has acquired a semi-official position, and the more loyal we are to it the sooner will uniformity prevail. Lastly, we have had thirty-three addresses delivered to us by Presidents of the Conference, all eminent in the profession of pharmacy, men whom I feel considerable diffidence in following, whose discourses have been on matters of deep interest to us all, and may be read at any time with pleasure and profit. So much is this the case that I have recently perused them, and propose to-day to say a few words about each, and so recall the views of men whose names have become, as it were, "household words" amongst us, and many of whom, I regret to say, are with us in person no more. If in the performance of this task I appear to dispose of any man's wisdom in very few words, believe me it is not due to want of appreciation thereof, but, as our chief business is listening to and discussing the papers which are to come before us, I am anxious not to weary you with a long and tedious address.

MEETING OF FOUNDERS AT NEWCASTLE.

The first occasion, then, on which the founders of the Conference gathered together was in 1863, at Newcastle-on-Tyne. That model pharmacist, Henry Deane, presided, and dealt with the objects, aims, and constitution of the Association and the advantages likely to accrue from its formation, namely, brotherly unity, the raising of the practice of pharmacy as nearly as possible to a profession in the public estimation, increase of knowledge, to induce members of our calling to exercise their ability and to avail themselves of the opportunities they may possess to investigate matters connected with their calling and to communicate the results to their brethren, to improve and maintain the purity of medicines.

In 1864, at Bath (the first annual meeting), Mr. Deane dealt with the first British Pharmacopœia, which had been published

since the previous meeting, the great responsibility of chemists, under Lord Campbell's Act, in cases of accidental poisoning, and regarded the position as a serious one in which all were interested. He referred at some length to a case which had recently occurred in Liverpool, which seemed to strike terror into the heart of every member of the craft.

In 1865, at Birmingham, Mr. Deane again presided, and made further reference to the Pharmacopœia, which was already under revision by a committee. He also dealt once more with the subject of accidental and also criminal poisoning, and further urged his hearers to strive to elevate the calling they had allied themselves to. He said: "There is no trade or calling with which I am acquainted that is so capable of a high development as that we are privileged to follow." In referring to unhealthy and questionable competition, he mentioned "low prices" and the piracy and imitation of well-known and recognised preparations which had taxed the brains of those who had laboured to perfect and introduce them. He condemned the then growing tendency to use methylated spirit in medicinal preparations.

In 1866, at Nottingham, Professor Bentley addressed the meeting at some length "On the Study of Botany in Connection with Pharmacy." He showed how useful it would prove in the detection of adulteration, in the utilization of indigenous herbs, in the search for new medicines, in determining the best conditions of growth, and the most active and suitable parts of plants for use in medicine, and, in short, proved to the satisfaction of his hearers that the science of botany was an essential part of the education for our profession.

In 1867, at Dundee, Professor Bentley continued his subject, regarding it as a healthy mental exercise, an agreeable and healthful recreation.

In 1868, Daniel Hanbury presided. He congratulated those present on the success of the Conference, the membership then having reached 550, and referred to the American and Continental associations which were doing similar work. He referred to the progress in science and pharmacy during the year, and passed on to consider a matter in which he was a special authority, viz., the cultivation of cinchona and other medicinal plants in India.

In 1869, at Exeter, Daniel Hanbury again referred to the continued success of the Conference, the new Pharmacy Act, to the investigations into cinchona by Howard and Broughton, and into ipecacuanha (which had then grown scarce and dear) by Lefort;

the difference in medicinal value between dry and fresh drugs by Schombroodt, and into aconitine by Merck, and precipitated sulphur by Attfield.

In 1870, at Liverpool, Mr. Stoddart dealt with the education which, in his opinion, pharmacists should possess, both general and technical, remarking that "Chemistry, botany, and physics were to us only second in importance to a well-grounded general education." He pointed to the application of the spectroscope in the examination of some chemical and pharmaceutical substances, and detailed the various subjects which had been under the consideration of the scientific world during the preceding year.

In 1871, at Edinburgh, Mr. Stoddart continued to advocate a higher development of our calling, and enumerated some instances of scientific work which had recently been accomplished, more particularly the synthesis of organic bases, pointing out that if we were to hold our own and render pharmacy a profession, we must show our aptitude for scientific research, and allow it to occupy the position of recreative change from the monotony of the more commonplace duties which fall to our lot.

In 1872, Mr. Brady pointed out that now the *Year-Book* had been published, it was no longer necessary for the President to review the progress of pharmacy during the previous year, and he proposed to deal with matters of present and future interest. He took as his starting-point a remark which had recently been made by Professor Huxley in an address which had reference to medical education, that "the standard British work on materia medica was a treatise *de omnibus rebus*, and that the science was a heterogeneous mass of facts referable chiefly to biological, botanical, and chemical science." He (Mr. Brady) argued that if this were so, the greater the necessity arose for pharmacists to acquire practical knowledge, and by inference the attainments of the pharmacist must be complementary to those of the medical practitioner. He regarded the obtaining of the Pharmacy Act as a means of placing the profession of pharmacy on a sound scientific basis. Dealing with the examinations, he said, "The Board of Examiners of the Pharmaceutical Society were fully alive to the importance of a higher standard of preliminary education." He thought that the Major should be regarded in the light of the fellowship of the College of Physicians and Surgeons, or of the *Pharmacien de la Première Classe* in France. He disapproved of the Pharmaceutical Society accumulating its unused balance of income, and suggested its application to the endowment of research in the laboratories at

Bloomsbury Square. He made several other suggestions which have since been carried out by the Pharmaceutical Council, and concluded by describing the proceedings of the American Pharmaceutical Association, which he had recently attended, and which were conducted on a more extensive scale than those of our own Conference.

In 1873, Mr. Brady enlarged on the success of the Conference in the first decade of its existence. He remarked on the proposal for a general fusion of Pharmacopœias, on the introduction of new remedies, and on the value of many indigenous remedies, to some of which attention had recently been directed. On the introduction of cinchona plants into India and Java by the British and Dutch Governments, and the success attending the same. He criticised the new regulations of the Pharmaceutical Society's School whereby a five months' course of training for the purpose of preparing men for the Minor examination had been instituted, and compared the preparation and examinations required in Germany for obtaining the qualification with our own, to the disadvantage of the latter.

In 1874, Mr. T. B. Groves explained the reason for meeting in London instead of Belfast, where the British Association was then holding its meetings. The great differences which then existed between the apothecaries and the chemists and druggists of Ireland rendered it difficult to bring about that concerted action which was necessary to render the Conference meeting a success. He reviewed the condition of the School at Bloomsbury Square, and expressed his disapproval of shortening the course of lectures, etc., adding some excellent remarks on the training of youths entering the calling of pharmacy. He then justly and severely criticised the working of the Food and Drugs Act, and showed how the zeal of the inspector and analyst often exceeded their discretion; concluding with some remarks on the growing sale of patent medicines and on the proposed International Pharmacopœia.

In 1875, at Bristol, Mr. Groves delivered his second address, congratulating the Conference in again being in touch with the British Association; he feared that had it been otherwise, the meetings would soon prove a failure. Speaking of provincial associations, he suggested that when short of papers for their meetings, they may continue the consideration of some of the half-discussed papers which had come before the Pharmaceutical Society. He urged the desirability of earlier closing, and expressed regret that the Council of the Pharmaceutical Society had

not seen fit to adopt Mr. Schacht's proposal to institute a practical pharmaceutical laboratory for students at Bloomsbury Square. Reference was made to the passing of the Irish Pharmacy Act and the founding of the Irish Pharmaceutical Society. Referring to the then recent meeting of the International Pharmaceutical Congress at St. Petersburg, he expressed a fear that it would be many years before its chief object would be accomplished, viz., the publication of an international pharmacopœia. He suggested that the Government should make money grants for physiologically testing new remedies by a competent commission. The new drugs mentioned in particular were jaborandi and its alkaloid, discovered by Mr. Gerrard, and araroba or goa powder. The obituary list included the name of that great pharmacologist, Daniel Hanbury.

FIRST VISIT TO GLASGOW.

In 1876, at Glasgow, Professor Redwood referred to the ethics affecting "counter practice," to the knowledge necessary for selecting special foods for those who required them, and to the effect of investigation on our drug supplies from abroad, and also to the separating of the active principles of drugs. He expressed a hope that science would soon enable us to unlock the secret of artificially preparing the vegetable alkaloids, and passed on to consider the germ theory of disease as enunciated by Professor Tyndall, and the operation of antiseptics and disinfectants in combating various maladies. He concluded by referring to the British Pharmacopœia, and supported the claims of educated pharmacists to assist in the production of its formulæ.

In 1877, at Plymouth, Professor Redwood dealt with the early history of pharmacy from the middle of the eighteenth century; its relation to early medical practice, the controversies between those representing the two branches of the healing art, and the ultimate separation of the two into distinct professions.

In 1878, at Dublin, G. F. Schacht said he would endeavour by consideration of the past and present to look into the future. He took as his theme "The Business Life of a Pharmacist," and traced up from his schooldays his ideal of what such an one should be, and the possibilities which surrounded him in his career. He drew a mental picture of a model pharmacist with high aspirations for his calling and a strong consciousness of duty.

In 1879, at Sheffield, Mr. Schacht took the counterpart of the previous address, and considered "The Pharmacist from the Public Point of View." He held that it was a loss not only to the

pharmacist, but to the medical profession and the public that he was not more highly appreciated by both. He felt that our social status would be much better, and a professional character attained more readily, if both medical and pharmaceutical students had to go through the same early training and pass the same Preliminary examinations.

In 1880, at Swansea, Mr. W. Southall took "Ancient Pharmacy" as his theme, giving a number of interesting quotations from the works of Celsus.

In 1881, Mr. Richard Reynolds gave a highly interesting address, taking first the old pharmacopœias, the polypharmacy which obtained in olden times, the reaction which occurred, and the gradual building up of our materia medica. He spoke of the diversity of strengths which occurred in new and unofficial remedies, and regarded the *Year-Book of Pharmacy* as the work in which semi-official formulæ should be published. He referred to the diminished cost and increased use of drugs which were at one time very expensive, the smaller number of prosecutions under the Food and Drugs Act, the increased facilities for early sound education, and suggested united action in passing a Bill through Parliament which would do away with the anomaly of the store question.

PHARMACISTS AND THE PUBLIC.

In 1882, at Southampton, Professor Attfeld dealt with some vital questions which lie at the foundation of our art. As to the utmost efficiency in collecting, manufacturing, and distributing drugs, and whether the public and the State were served to the best advantage under the existing state of things? He made some valuable suggestions in reference thereto; also on pharmaceutical legislation and organisation.

In 1883, at Southport, Professor Attfeld considered "The Future Supply of Drugs to the Public," taking the relation of the State to pharmacy as the second part of his subject. He considered that the Pharmacy Act of 1868 was a failure, and required speedy amendment, and that nearly all drugs should be included in its schedules. The Professor had collected evidence from some two hundred districts in Great Britain, showing that drugs were being sold largely by grocers and other tradesmen at a marginal profit, and that chemists' businesses had largely depreciated in value. He then went on to consider some of the causes of depression in the drug trade, such as the tendency amongst medical men

to prescribe more concentrated medicines, the smaller quantity of drugs taken by the public, the increased number of charitable medical institutions, the tendency to prescribe more proprietary articles, and the prominence which chemists had been in the habit of giving to so-called patent medicines. He considered the remedy would be found in an extension of the present Act.

In 1884, at Hastings, Mr. John Williams treated of matters which the world of chemical science around had been doing, and which had more or less bearing on pharmacy, mentioning more particularly the artificial production of substances representing several organic bodies. He then referred to the nitro-substitution compounds, such as nitro-glycerin and nitrite of amyl, being introduced into medicine; to artificial salicylic acid, which he did not consider possessed equal medicinal value to the natural product; to the recent liquefaction of some of the more refractory gases; to the vital processes in plant life; and to the approaching new pharmacopœia, emphasising the claims of pharmacists to official recognition in the production of the work.

PHARMACOPŒIA REVISION.

In 1885, at Aberdeen, Mr. J. B. Stephenson commenced by making some observations on the responsibilities placed on the Pharmaceutical Society by the State, and considered that the Society, in the fulfilment of these duties and responsibilities, had power to regulate the examinations, even to the extent of imposing a curriculum if it was thought desirable, and the approval of the Privy Council could be obtained. He dwelt on the advantages of the differentiation of pharmacy from the practice of medicine, and pointed out that fully forty years before that date Edinburgh had taken the initiative in that respect. He advocated that pharmacists should be appointed on the Pharmacopœia Committee; and further, that pharmacy being a profession, the services of those who practised it should receive professional remuneration. His concluding remarks had reference to the newly-published pharmacopœia.

In 1886, at Birmingham, Mr. Greenish also referred to the Pharmacopœia, and expressed an opinion that it did not represent the advance which had taken place in pharmacy since the issue of the previous one. Passing on to consider the work of the Conference, he suggested that it may be of use in solving a difficulty which was sapping the foundation of pharmacy—viz., the prescribing by medical men of factory-made articles, by publishing

certain formulæ under its authority. On the question of education he suggested that the country should be mapped out into districts, and a committee be appointed in each district authorised to arrange for suitable educational provision in each district for the would-be pharmacist.

In 1887, at Manchester, Mr. R. S. Atkins presided. It was the year of the first jubilee of Her Majesty, and the address dealt with the history of chemical and other sciences and of the Pharmaceutical Society during the period of the Queen's reign, and some remarks, historical and prophetic, on our position and calling. Reference was also made to the work of the Conference and to the recently-introduced new remedies. He advocated an extended Preliminary examination, and hoped for greater unity amongst the members of our craft.

THE RELATION OF PHARMACY TO PHARMACISTS.

In 1888, Mr. F. B. Bengier took as his text "The Relation of Pharmacy to Pharmacists," to ourselves, and the education and training most likely to improve that relationship. Whilst duly considering the higher claims which the professional side of our calling had for us, he took the very practical view that we had to live by that calling. He mentioned the processes which were at work which rendered it more difficult to do this as time rolled on, and then passed to consider how a better training and higher development of our art opened up opportunities for us. He quoted the opinions of a number of eminent men in different countries in support of these views.

In 1889, at Newcastle-on-Tyne, Mr. Chas. Umney based his address on one of the objects of the Conference, viz., "To Maintain Uncompromisingly the Purity of Medicines." Starting with the seventeenth century, when empiricism reigned supreme, he traced some of the causes which led to improvements in the purity, character, and preparation of medicinal substances, particularising in modern times the improved pharmacopœias—that published in 1885 being in his opinion a model one—the working of the Adulteration Act, and the more reasonable excise regulations which now existed. He advocated more extensive pharmaceutical research, and a more suitable training for chemists so as to enable them more frequently to fill the position of public analysts, and thought that this higher training would inspire the public favourably as to the importance of our calling. He approved of examinations, but felt that they were not an unmixed blessing so

long as young men were content with the minimum of knowledge which could enable them to pass them.

In 1890, at Leeds, Mr. Umney, in a short but very suggestive address, treated on "Fashion in Medicines," mentioning some valuable remedies which had been discarded in favour of newer but not always better ones. He condemned the growing tendency to prescribe ready-made compounds, and to adapt the disease to the remedy rather than the remedy to the disease. He mentioned that the British public spent annually about one and a half millions sterling in so-called patent medicines, and advised the abolition of the patent medicine stamp, and concluded by pointing out that the Conference had done something towards bringing about a better appreciation of the pharmacist by the medical profession.

W. MARTINDALE AS PRESIDENT.

In 1891, at Cardiff, Mr. Martindale first referred to the pharmacist in relation to the public, and pointed out that he rarely shared in the gratitude felt by the patient towards the doctor, nurse, and friends who tended him during a severe illness, but he considered that we met with more appreciation in our relation to the medical profession. He then dealt with the relation of the chemist to the physiologist, reviewing the introduction and use of some new synthetic remedies, more especially the coal-tar products, also the use of the various lymphs in the treatment of zymotic diseases, etc. He remarked on the tendency of the medical profession to ignore the necessity for a knowledge of drugs and preparations, and considered that this would deprive them of any confidence in prescribing them, and they would thus become a prey to advertising manufacturers of ready-made mixtures, etc. He took exception to the increase of synonyms in the British Pharmacopœia, and concluded by reference to the necessity for extension in the knowledge required for the Preliminary examination.

In 1892, at Edinburgh, Mr. Stanford dealt with a variety of interesting topics: The rise and progress of the Conference, national progress, including parcel post, telegrams, tramways, gas, electricity, steam, hygiene, chemistry, photography, some manufactures, education, general and pharmaceutical, pharmacy, botany, patents, poisons, ptomaines, etc. Mr. Stanford held that a pharmacist could not be over-educated, and expressed a regret that there were not more pharmaceutical chemists, mentioning Glasgow in particular, where there was only one pharmaceutical

chemist to 41,012, whilst in Edinburgh there was one to 7,061 inhabitants.

In 1893, at Nottingham, Mr. Corder, after some preliminary remarks on what he regarded as a proper apprenticeship (seven years being too long and three years too short a period), and insisting on the necessity for good early training, took up as the subject of his address "Some Herbaceous Plants in common Cultivation, Especially those Connected with Medicine." Mr. Corder traced the early history of botany as a science with Aristotle as its founder, and then passed on to review the early herbals. The "Greta Herbal" by Treveris, in 1516, being the first published in English, Turner's in 1568, Lyte's translation from the Dutch in 1583, and Gerard's in 1597, all passed under review, and some interesting comments were made on them. He recommended the study of Gerard in particular, giving some curious quotations therefrom, and concluded by referring to some indigenous plants.

MEDICINE AND PHARMACY.

In 1894, at Oxford, Mr. N. H. Martin took for his text "Medicine and Pharmacy," and dealt frankly and boldly with some of the evils which existed in both professions in their individual capacities and in their relation to each other. He showed that the condition of pharmacy in its own special domain was unsatisfactory, and attributed this to "the unbridled and dishonest competition in prices" brought about by the increased use of proprietary medicines and the publicity given to them by members of our craft. He held that the reason medical men prescribed them to such an extent as they did was because the medical student had insufficient training in the knowledge of the properties and uses of drugs. Mr. Martin pointed out the absurdity of attempting to practice pharmacy on a trade basis, and yet retain the reward which properly belonged to professional services. He held that in the Pharmacy Act the public accorded to the pharmacist a professional standing, and adherence to that position was the only safe ground on which future pharmacy could stand. He pointed out a course of training which he held to be essential to the individual who should enter our craft and the principle on which his remuneration should be based, and concluded with a tribute to the usefulness of the British Pharmaceutical Conference.

In 1895, at Bournemouth, Mr. Martin again dealt with pharmacy. He considered that its condition in this country was most

unsatisfactory, that it held a position between a false assumption of science and the whirlwind of modern trade. He referred to the dignity of pharmacy, and considered that the 1868 Act had failed to maintain that dignity by not providing for a curriculum of higher training for those who were to enter our craft. He held that the Major examination was the only one which should admit a man to membership of the Society, and advocated a still higher examination for a fellowship. He had doubts as to the success of Federation of Provincial Associations, and also of provincial schools until a new Act demanded a suitable training. He next considered the duties in pharmacy and the relation of pharmacists to the Pharmacopœia, expressing a doubt of the success of attempting to train young pharmacists in research work, suggesting that it would be better performed by those of more mature experience, and concluded by reference to the pleasures which accrue to those who practise pharmacy with a real love for the art.

In 1896, at Liverpool, Mr. Martindale remarked on the meeting in Liverpool twenty-six years previously, mentioning in particular an interesting pharmaceutical exhibition very free from objectionable details. He then proceeded to review the changes which had occurred and the medical substances which had been either newly introduced or had, from rare specimens, become common since that meeting. "The first practical pharmacopœia," that of 1867—new active principles, reduced cost of, and commerce in drugs, cost of distribution, progress of elegant pharmacy, medicines in relation to medical practice, the value of medicines as estimated by the medical practitioner in the treatment of disease, advertising pharmacy, and the future of pharmacy, which he considered somewhat obscure—all received attention. The address was delivered so recently that it will be fresh in your memories, and I need not detain you with further details.

A FEW HISTORIC FACTS.

Having thus briefly reviewed the various presidential addresses, let me give you a few historic facts concerning the progress of the Conference. At first a very small volume of "proceedings" was published, and the annual subscription was 5s. Now we have a very complete *Year Book*, containing a review of chemistry, materia medica, and pharmacy, together with a valuable collection of notes and formula, which should be found in the pharmacy of every member of our craft, and the subscription is only 7s. 6d., so that in this respect we are giving far more value to-day than in

the early days of our existence. At the first annual meeting, held in 1864, there were 150 members, a credit balance of £10, there were four days' sittings, and twenty-eight papers were read and discussed. A year later the membership had increased to 350, and by the end of the following year to 400; in 1867 to 478, and in the fifth year of its existence to 562, with a credit balance of £35.

Passing on to 1873, ten years after its foundation, the membership had risen to 2000, the credit balance had disappeared, and had left in its place a debit, one to the extent of £4, and the subscription was increased to 7s. 6d. In 1874 a circular was sent to every member of the trade who was not already associated with the Conference, and as the result 500 new members were added, at the same time 115 were struck off the roll on account of being considerably in arrears with their subscriptions. In 1876 there was a credit balance of £430, and the Committee anticipated at least a further sum of £200 in excess of expenditure on the current year. Grants amounting to £75 were made in aid of research. In 1880 it was decided to issue a general index of the *Year Books* which had been published from 1870, and for the six numbers of "Proceedings" which had been issued before that date. In 1883 (twenty years after its foundation) Colonial Secretaries were appointed, and at the annual meeting 359 ladies and gentlemen were elected members, bringing up the total again to 2,000, the credit balance was then £222. In 1884 the Committee had under consideration the growing tendency to lavish expenditure in entertainments at the centres where the Conference held its meetings, and a resolution was passed considering this undesirable, and expressing a view that the meetings should be held wherever mutual advantage was most likely to arise, irrespective of financial considerations. In 1885 150 Colonial members were elected, and the general index (which had been delayed) was published, costing the Conference £150 over and above the amount received on sales at 2s. 6d. each. In 1886, the first reception by the President was held on the evening preceding the Conference meeting. In 1887 the first *Unofficial Formulary* was published. In 1890 there were 1,500 home and 200 foreign members, a credit balance of £86, and twenty-nine papers were read. In 1893 (thirty years after its foundation) the Committee were able to report as follows: "There is no evidence of any decline in the interest taken in the work of the Conference." In 1896, still fresh in your memory, the home membership was 1,330, and the foreign members numbered

180, with a debit balance of about £50. Apart from this, the meeting was a very successful one, twenty-two papers being read and discussed.

Such, then, is the structure which in thirty-three years has been built up, and this is a somewhat imperfect record of its work. The Conference has never possessed, has never desired to possess, any legislative powers to regulate the conduct of our business; nor to encroach on matters which are essentially the province of the Pharmaceutical Society. But from its inception it has, within the lines laid down as to its objects, recognised the fact that we have to live by our craft, and it has contributed considerably to that end.

EDUCATION AND EXAMINATION.

There is one feature which predominates in the various addresses given, viz., the advancement of our calling by education, and if pharmaceutical education has kept pace with general education during these thirty-three years, assuredly we ought in the present day to be feeling some of the good results hoped for. There now exists a Pharmacy Act demanding compulsory, in the place of voluntary, examination, which has produced a larger number of men with a more complete knowledge of their business, and no one can doubt that as a body we are better educated than formerly.

But in this country reforms move slowly, and although it has been recognised almost from the first that the Preliminary or arts examination provided too low a standard for those who were to enter our calling, it is only within the last few months that any decided step has been taken to raise it, so that the entrance to the business has been left very simple; whilst the stringency of the Minor or qualifying examination has been increased, so that men have only become aware of their want of education for the business years after they have been committed to it; hence, in my opinion, the large percentage of failures which occur. Then, although there has from time to time been very determined attacks on the practice which is described by that ugly word "cram," our system of examination has offered a premium to it.

A youth passes his Preliminary on leaving school and becomes an apprentice, when, if he is determined to study, or his master insists on his doing so, all may go well. But the chances are that he thinks very little about an examination for which he cannot possibly present himself until the lapse of some five or six years,

and he drops into that common and alluring belief that a large amount of recreation is necessary for his health and happiness, and with the imbibition of this belief, the habit of study which he has acquired, and which has become quite easy to him, disappears. Neither, as a rule, does his master feel the responsibility of seeing him through an examination which the youth cannot pass until he is out of his apprenticeship, and no longer under his care. As a result of all this, when he approaches maturity he "crams" in a lot of knowledge such as is required by the examiners, and he may pass; but that knowledge, like so much undigested food, does him little good, and he may still remain uneducated in his art. We want examination to be regarded not merely as a test of a man's knowledge, but also as a part of his education. If an interim examination were instituted which could be passed say two or three years after registration as an apprentice or student, and which would comprise some of the subjects now taken in the qualifying examination, there would be an inducement for a youth to study from the commencement of his business career, there would be a gradual building up of his knowledge, it would become part of himself and would be permanent. Hitherto it has been assumed that this could not be done under the present Pharmacy Act, but such a view appears to me a mistake. The Act has practically nothing to do with the details of the examinations, but provides that they shall be conducted according to the provisions contained in the Bye-laws. Mr. Stephenson, in his address, expressed an opinion that the provisions of the Act were wide enough to enable the Council to introduce a curriculum of study if it were considered desirable and it met the approval of the Privy Council. And I now express my conviction that it would be perfectly legal to further divide the qualifying examination. As a matter of fact, it is in practice now divided, the candidate often passing one portion in one week and the other portion during the next week, and I feel sure it would be for the benefit of the candidate if the examination were arranged so that two or three years intervened instead, and the legality of such an arrangement would be supported by the present Bye-laws. Section XI., paragraph 1, reads as follows: "The Registrar shall receive, and for at least five years preserve, the lists issued by the Examiners, signifying that examinations or parts of examinations have been passed."

Excellent as the qualifying examination now is, I believe there is still a want of more complete means of testing the power of the

candidate to apply the knowledge he possesses, and the result of such would be that we should then have less complaint of the deficiency in practical knowledge of examined men, the qualification would be better appreciated when obtained, and would serve the owner a more useful purpose through life than it now does.

PHARMACISTS AND THE PHARMACOPŒIA.

We are on the eve of the publication of a new pharmacopœia, and no doubt it will, in common with previous ones, receive a due amount of criticism. The last work was regarded in one address at least as a failure, whilst in some others it was mentioned as a success. Clearly, therefore, opinions differ as to its merits. There has been an effort to make the forthcoming work more fully appreciated throughout the British Empire and its colonies by including formulæ used in other than the "home land." Whether this be published at once or completed by an appendix there will be abundant opportunity for discussion, and we may hope that it will receive a better endorsement than did the first British Pharmacopœia. It is to be regretted that pharmacists have not yet been accorded the position which justice demands that they should possess as members of the Pharmacopœia Committee.

The Pharmacopœia is a pharmaceutical and not a medical work, and yet no pharmacist has any legal standing or position other than that accorded by courtesy. What would be thought of a work on medical practice published "by authority" by a committee of pharmacists aided by medical men? The position is an anomalous one, and must sooner or later be corrected. The sooner the better will it be for all concerned.

THE MEDICINE STAMP DUTY.

In several addresses the rapidly-growing consumption of so-called patent medicines was referred to, and the impression seemed to be that, so far as chemists were concerned, the sale of them had almost become a thing of the past; that having been unwise enough to give them an undue prominence, we had contributed to the increased sale, and then it had passed from us by competition to grocers and others. This to some extent is so, and that not altogether to the moral disadvantage of our calling; but we cannot get away altogether from what is known as the Medicine Stamp Act, and there exists a general impression that its operations hamper us considerably in the legitimate conduct

of our business. At first sight it certainly does appear to be an unfair impediment to trade that we cannot label fully, describe and recommend the goods we sell without either bringing them into the category of "quack medicines," by the use of the duty stamp, or incurring the risk of infringing a somewhat complicated Act of Parliament, resulting in an excise prosecution.

My attention has, however, been directed to some of the evils which may follow its repeal if we were able to obtain it, and further there is a provision in the exemption clauses which, I think, well worth consideration, as we may find the Act a friend in disguise. It is really a drugs Act, and covers all kinds of medicinal substances, both simple and compound; then there are exemptions comprised in three paragraphs. The first to certain drugs in the book of rates, the second to simple drugs which can be sold by surgeons, apothecaries, chemists or druggists, and persons holding a licence to sell medicines chargeable with stamp duty. The third exempts all mixtures, compositions, and preparations, the properties of which are known and recognised, and for the preparation of which no secret is claimed, and the title of which is common property—so long as they are sold by a surgeon, an apothecary, or a chemist or druggist. Here, then, it seems to me, we have a distinct recognition of our calling as a responsible profession in a provision whereby we enjoy the privilege, together with surgeons and apothecaries, of being able to sell compounded drugs under the conditions specified without the use of the duty stamp, whereas such compounds cannot be sold under any conditions by grocers and other traders without bearing the medicine stamp.

OPERATION OF THE PHARMACY ACT.

In several addresses which followed the passing of the Pharmacy Act in 1868, great hopes were expressed that it would not only elevate our calling, and give it a decidedly professional character, but it would protect our interests also. Now, after more than a quarter of a century, we find the results of its operations to be very different from those which were anticipated, and considerable disappointment has followed. As a body we are certainly better educated than when the Act came into force, but the titles which we thought had been so thoroughly and completely safeguarded, whilst denied to unqualified individuals, can be used by stores with impunity. The decision of the House of Lords, which gave stores the right to sell poisons at the hands of qualified assistants, will, I fear, never be reversed, but the use of the title "chemist"

by a directorate on which there is no qualified man is a gross misrepresentation, and one which, in common justice to the public, ought to be prevented.

COMPETITION AND PIRACY.

The next subject which has received attention in many addresses is the cutting competition in prices, to the detriment of the business. Mr. Deane mentioned this in his first address, but if he had occasion to do so in his day, when there was no store competition, what would he think of the present state of things? Dr. Attfield dealt largely with the subject, and suggested as a remedy that nearly all drugs should be scheduled under the Act, so that they could be sold only by registered persons. Mr. Martin aptly put it that for professional services we ought to receive professional remuneration, but not so for commercial transactions. If, however, we separate the commercial portion of the average chemist's business, we find that the percentage of profit on it is far less than that obtained by the draper, ironmonger, etc. If this cutting competition were limited to stores, we could hope that some remedy may be found, but it is the competition within our own body that it is most difficult to deal with.

In his first address Mr. Deane justly complained of the piracy and imitation of well-known and recognised preparations, which had taxed the brains of those who had perfected and introduced them. In those days this class of medicines were not numerous, but they were really good, and were prescribed by the medical profession. Now good, bad, and indifferent, their name is legion, and Imitator & Co. are as busy as ever, so that it would be difficult to say we have progressed in this respect.

Ready-made formulæ in a variety of fancy forms are now thrust on medical men by agents who were at one time known in America as "Drummers," but who have more recently appropriated the title of "Missionaries," as they regard the conversion of the medical profession to a belief in their nostrums as missionary work. This has brought about a state of things complained of in several addresses—Mr. Greenish mentioning the growing use of "factory-made articles," Mr. Martindale showing how medical men were becoming a prey to advertising manufacturers of ready-made articles, and Mr. Martin mentioning the tendency amongst medical men to adapt the disease to the ready-made formulæ of some special manufacturers. Much as this is to be regretted, I believe it is the reaction from empiricism and over-dosing. Those

branches of science which tend to assist the medical man in a correct diagnosis of disease have made rapid strides in recent years, and the importance of these has been so fully appreciated, and a correct diagnosis has assumed such importance in the medical mind, as to force the question of drugs into a very minor position. This, like every other reactionary extreme, will in due course find its level, and time will be the chief factor in determining the result. Meanwhile, it is not the duty of the pharmacist to stand still and wait, not to devote his energy and ability to pharmaceutical quackery, but by integrity, legitimate enterprise, and earnest scientific work, to raise the standard of his calling, and thus facilitate the acceptance by the medical profession of a state of things in which he will reap the reward of his labours, and both professions will be accorded an enhanced amount of confidence and respect by the public.

CONCLUSION.

I cannot conclude this address without mentioning our indebtedness to Thomas Hyde Hills for his liberal donations in the early years of the Conference, whereby it was enabled to commence the endowment of research, and has since been enabled permanently to make a present of books to the association in each locality in which it holds its meeting; also to Mr. Thomas Hanbury for his annual present of books for a similar purpose. Neither must I omit to say how much we are indebted to the Honorary Secretaries for the success which the Conference has achieved. To their care, watchfulness, and exertions through the vicissitudes of its career, its continued existence is largely due, and that it is to-day enabled to render so good an account of itself.

During thirty-three years the Conference has promoted the scientific advancement of our calling, has fostered friendly intercourse amongst us, has shown a deep interest in all matters affecting our material welfare, and should command the gratitude, sympathy, and membership of the whole craft.

Would that I could end this discourse here, but justice demands that I detain you a minute longer in the performance of a painful duty. This Conference, Pharmacy generally, and the whole scientific world are the poorer for losses by the unsparing hand of death since our last meeting. I cannot enumerate them all, but the name of George F. Schacht is so familiar to us, and the fine intellectual figure of the man has been so constantly before us, that it seems but a dream that he has passed away, and we are to

meet him here no more. Full of honourable and useful years, and a benefactor to his craft, he has left deep footprints in the sands of time. F. M. Rimmington, of still riper years, has recently gone to his rest, after a long and useful career as a pharmacist, public analyst, a former vice-president of this Conference, and for some years a member of the Council of the Pharmaceutical Society. Arthur J. G. Tyrer (whose father is so well known to us, and whose brother is a contributor to our meetings) was a young man of considerable ability and promise; he had prepared a very excellent paper, which I understand was to have been read at this meeting but for his premature and tragic death.

The Philadelphia College of Pharmacy, in which we all feel much interest, has lost Dr. Bastin, the successor to Professor Maisch, and an aged vice-president, Mr. Robert Shoemaker. This does not complete the list, but I have said enough on this solemn subject to suggest that it is important for us all to work while it is yet day, for the night comes when no man can work.

MR. E. C. C. STANFORD moved a hearty vote of thanks to the President for his excellent address. When he had the misfortune to occupy the same position at Edinburgh, it afforded him great consolation to know that criticism of the address was not permitted. But if he were able to criticise this address, he could only do so in the most laudatory manner, seeing that Dr. Symes had dealt so kindly with the addresses of all his predecessors. He would only say that it was worthy of the author and of the occasion. It was difficult to believe that it was thirty-four years since the little band which founded the Conference met in Newcastle, and it was sad to think how many of those noble men had been taken from them. They little thought then what the Conference would grow to, or that they should see such a meeting as the present.

MR. W. L. CURRIE seconded the vote of thanks. In this year of records he thought they had established a record meeting of the Conference, and the President had certainly given them a record address.

Professor ATTFIELD, in putting the motion to the meeting, said with regard to those who started the Conference in Newcastle-upon-Tyne in 1863, he could endorse every word that had been said by the President. No doubt the credit of the initiation of the idea of a conference must be given to their lamented friend Mr. Schacht, who held the opinion that the Pharmaceutical Society of

Great Britain should hold an annual meeting in the provinces, and this idea was developed by Mr. Brady and Mr. Reynolds, who with himself (Dr. Attfield) issued the first invitation circular. He must not forget to allude also to one who, in his day, was called the father of the Conference, not only by virtue of his years, but because he was the first President; every credit must be given to their dear old friend, now long passed away, Mr. Henry Deane, for giving the Conference such a hearty god-speed, and such an impetus as he did. The admirable retrospect given by the President had in it an element of sadness, which indeed he had alluded to at the close, but which he also might have extended when referring to the different Presidents who had addressed the Conference. When he (the speaker) took up one of the *Year-Books* and looked to those who had been President before him, he found to his sadness that out of the ten names there mentioned not less than eight were the names of men now passed away, and only Mr. Groves and Mr. Reynolds remained; but, on the other hand, of those who succeeded him, out of the first twelve names no less than eleven were those of good men still with them, all hearty supporters of the Conference. He was sure no one would rejoice more than their President, when he looked around the meeting that day, to see there assembled many men well qualified to become future Presidents of the Conference, and to maintain its reputation for many long years to come. It was a happy thought of the President to summarise in the admirable way he did the utterances of those who had occupied the chair prior to himself. He must praise the President not only for his powers of concentration, but also for the fairness with which he had accomplished that task, and as regarded his concluding remarks, although he (Dr. Attfield) must not say one word either for or against the position taken up with regard to the British Pharmacopœia, because of his official connection therewith, he would say that with regard to every one of the other subjects alluded to by the President, each was characterised in his humble judgment by sound common sense throughout.

The resolution having been passed unanimously,

The PRESIDENT thanked the meeting for the very hearty manner in which it had been received. He might say that he had been afraid of wearying them with a long and tedious address, but now that they had heard it they would be aware that it was almost impossible to curtail it.

RECEPTION OF DELEGATES.

Mr. W. A. H. NAYLOR (Hon. Gen. Sec.) then read the following list of delegates:—

Pharmaceutical Society of Great Britain.—Mr. Walter Hills (President), Mr. G. T. W. Newsholme (Vice-President), Messrs. Allen, Atkins, Bateson, Carteighe, Cross, Grose, Harrison, Johnston, Martindale, Park, Savory, Storrar, Symes, Warren, Young, and the Secretary.

Pharmaceutical Society (North British Branch).—Mr. J. L. Ewing (Chairman), Messrs. Currie, Bowman, Coull, Fisher, Henry, Kermath, Kerr, and Lunan.

Pharmaceutical Society of Ireland.—Mr. W. F. Wells, junr. (President), Mr. R. J. Downes (Vice-President), Mr. G. D. Beggs (Treasurer), Messrs. Conyngham, Kelly, Murray, Tichborne, and Walsh.

Aberdeen and North of Scotland Society of Chemists and Druggists.—Mr. John Johnston (President), Mr. J. Cruickshank (Hon. Sec.), Messrs. Paterson, Ritchie, Strachan, Greig, and McWeir.

Brighton Association of Pharmacy.—Messrs. Savage and Yates.

Edinburgh Chemists' Assistants' Association.—Messrs. Lunan and McLaren.

Exeter Association of Chemists and Druggists.—Mr. J. Hinton Lake (President), Mr. Henry Gadd, J.P. (Vice-President).

Forfarshire District Chemists' Association.—Mr. C. Kerr (President), Mr. J. Russell (Hon. Secretary), Messrs. Anderson, Ferries, Cumming, J. W. Russell, Jack, Harley, Ford, Naysmith, Davidson, and Fleming.

Glasgow and West of Scotland Pharmaceutical Association.—Messrs. Adam, Brodie, Currie, Dunlop, Foster, Fraser, Kerr, Laing, Lambie, McAdam, McKellar, McMillan, McMurray, Mitchell, Moir, Robb, G. Robertson, D. S. Robertson, Russell, Sutherland, Taylor, Tocher, and Watson.

Liverpool Chemists' Association.—Messrs. A. C. Abraham, Bain, Conroy, E. Evans, junr., Marsden, Wardleworth, and Cowley.

London Chemists' Assistants' Association.—Messrs. Guyer, Hill, Stephens, and Strother.

Manchester Pharmaceutical Association.—Messrs. Johnstone, Pidd, and Wild.

Midland Pharmaceutical Association (Birmingham).—Messrs. C. F. Jarvis, R. D. Gibbs, and Geo. E. Perry.

Newcastle-on-Tyne and District Chemists' Association.—Mr. J. Maltby Clague (President), Mr. G. Foggan (Vice-President), Mr. G. F. Merson (Hon. Sec.), Messrs. Sharp and Whittle.

Nottingham and Notts Chemists' Association.—Messrs. Bolton, Gill, and Vallance.

Oxford and District Chemists' Society.—Mr. G. C. Druce and Mr. H. J. Mathews.

Plymouth, Stonehouse and District Chemists' Association.—Mr. C. J. Park.

Sheffield Pharmaceutical and Chemical Society.—Mr. A. H. Allen.

Swansea and District Chemists' Association.—Messrs. Grose and Hughes.

LETTERS OF APOLOGY FOR ABSENCE.

Mr. Secretary NAYLOR announced that letters of regret for non-attendance had been received from F. H. Alcock, F.I.C., F.C.S. (Birmingham); Thos. Bateson, J.P. (Kendal); M. Carteighe, F.I.C., F.C.S. (London); M. Conroy, F.C.S. (Liverpool); E. H. Farr, F.C.S. (Uckfield); A. W. Gerrard, F.C.S. (Chertsey); T. B. Groves, F.C.S. (Weymouth); J. Harrison (Sunderland); W. Martindale, F.C.S. (London); G. T. W. Newsholme, F.C.S. (Sheffield); J. C. C. Payne, J.P. (Belfast); R. Reynolds, F.I.C., F.C.S. (Leeds); S. Rideal, D.Sc., F.I.C., F.C.S., F.G.S. (London); A. Southall, F.C.S. (Birmingham); Dr. Gordon Sharpe (Leeds); Louis Siebold, F.I.C., F.C.S. (Sale); G. S. Taylor (London); R. Wright, F.C.S. (Buxton); and C. Umney, F.I.C., F.C.S. (London).

Mr. F. RANSOM (Hon. Gen. Sec.) then read the following Report of the Executive Committee:—

REPORT OF THE EXECUTIVE COMMITTEE.

In presenting their annual report, your Committee have pleasure in stating that the efforts which have been made to increase the membership of the Conference appear to have resulted in some measure of success, the number of members at the present time being slightly in excess of that of last year. It is hoped that this may be regarded as an indication of increased interest in the Conference, and that the present year may see a further accession to membership.

It was mentioned in the last report that certain alterations were

contemplated in the production of the *Year-Book*. These have been carried out in the last volume, and a reduction in the cost has been effected, which it is believed has not been attended with any decrease in its general usefulness to members.

Mr. Louis Siebold has been re-appointed Editor, and the MS. of Parts 1 to 3 is already in the hands of the printers.

The Blue List has been revised by a Sub-Committee appointed for the purpose, and some additions and necessary alterations have been made.

Members are again reminded that the funds of the Conference are available for money grants to assist in defraying expenses incurred in pharmaceutical research; no applications for such assistance have been received during the past year.

In consequence of his removal to Calcutta, Mr. D. Hooper, F.C.S., resigned his position as Honorary Colonial Secretary for the presidency of Madras, and a resolution, expressing cordial thanks for his services, was passed by your Committee. Mr. W. E. Smith, of Madras, was elected as his successor. Your Committee venture to claim the assistance of all the honorary colonial secretaries in their efforts to extend the interest in and thus increase the membership of the Conference throughout the Empire.

By the death of Professor G. F. H. Markoe, of the Massachusetts College of Pharmacy, Boston, U.S.A., the Conference has lost a distinguished member. He attended the meeting at Brighton in 1872, and was on that occasion elected as honorary member.

The Conference has suffered an irreparable loss by the death of George Frederick Schacht, of Bristol, to whose initiation the very existence of the Conference may be said to be primarily due, and whose constant and active support has largely contributed to the measure of success it has achieved. He filled with distinction the office of President at Dublin in 1878, and at Sheffield in the following year. Exceptional ability and enthusiasm, combined with absolute integrity, produced in him the highest type of pharmacist, whilst his genial and kindly disposition commanded the affection and esteem of all with whom he came in contact.

Amongst other members who have passed away during the year we have to record the names of Mr. A. H. Mason, of New York, who previously rendered valuable assistance as Honorary Colonial Secretary for Canada, and Mr. F. M. Rimmington, of Bradford, a former Vice-President of the Conference.

The removals by death during the past year have been 26, and 8 by resignation, while 107 new members have been elected.

FINANCIAL STATEMENT FOR THE YEAR ENDING 30TH JUNE, 1897.

The Hon. Treasurer in Account with the British Pharmaceutical Conference.

1896.	Dr.	£	s.	d.	£	s.	d.
July 1.	To Assets forward from last year :—						
	„ Cash in Secretary's hands	1	14	7			
	„ Cash at Bank	16	12	7			
					18	7	2
July 1.	„ Subscriptions, June 29, 1896	3	7	6			
„ 3.	„ „ „ „	0	7	6			
					3	15	0
„ 3.	„ Cheques on Union Bank, Regent Street				1	8	9
1897.							
June 30.	To Sale of <i>Year-Book</i> by Publishers				13	13	4
	„ Advertisements, 1896 volume				80	7	8
	„ Unofficial Formulary, Sales by Publishers				2	2	2½
	„ Index Book, Sales of				0	0	0
	„ Members' Subscriptions, from						
	July 1, 1896, to June 30, 1897	397	19	6			
	Less not cleared at Bank	1	16	0			
					396	3	6
	„ Donations				32	1	6
	„ Liabilities on Outstanding Accounts :—						
	Butler & Tanner	14	15	3½			
	McCorquodale (wrappers)	5	9	6			
	„ Assist.-Secretary's Salary and Rent,						
	March 25 to June 30, 1897	13	15	0			
					33	19	9½
					£581	18	10½

1897.	Cr.	£	s.	d.	£	s.	d.
June 30.	By Expenses of <i>Year-Book</i> :—						
	Printing, Binding and Publish-						
	ing	171	12	2			
	Banding	3	18	2			
	Postage and Distributing	14	15	3½			
	Advertising, Publishers' Charges and						
	Commission	21	19	11			
	Editor's Salary	150	0	0			
	Foreign Journals for Editor	5	17	6			
					368	3	0½
	„ Unofficial Formulary :—						
	Advertising and Publishers' Charges				0	4	3½

1897.	CR.	£	s.	d.	£	s.	d.
	By Sundry Expenses :—						
	Assistant Secretary at Liverpool .	10	0	0			
	Copies of President's Address .	0	14	6			
	Forret's Paper	0	2	6			
						10	17 0
	„ Assist.-Sec.'s Salary from July 1, 1896, to June 25, 1897	45	0	0			
	„ Rent of Office from July 1, 1896, to June 25, 1897	10	0	0			
						55	0 0
	„ Blue List, Printing	3	7	6			
	Postage	2	12	2			
						5	19 8
	„ Postages					10	17 1
	„ Printing and Stationery					6	5 6
	„ Stationery					2	2 0
	„ Bank Charges					0	0 5
	„ Petty Cash Expended					2	8 5
	„ Liabilities of last year, since paid :—						
	Butler & Tanner, Postages, 1895-96	23	2	0			
	Butler & Tanner, Outstanding Ac- count	44	3	2			
						67	5 2
	„ Cash in Secretary's Hands :—						
	Petty Cash	3	11	11			
	Stamps	0	5	0			
						3	16 11
	„ Cash at Bank					48	19 5
						£581	18 10 $\frac{3}{4}$

The Bell and Hills Fund.

1896.		£	s.	d.	£	s.	d.
July 1.	To Balance in hand	16	10	5			
1897.							
June 30.	„ One Year's Dividend on Consols	9	11	8			
						26	2 1
	By Purchase of Books for Liverpool					8	7 3
	Balance at Bank					£17	14 10
	Assets :—						
	Cash Balance at Bank	17	14	10			
	£360 2 $\frac{3}{4}$ Consolidated Stock	360	0	0			
	Examined and found correct, { ANTHONY S. BUCK, WILLIAM L. CURRIE, } Auditors.						
	July, 1897.						

The HON. TREASURER (Mr. Moss) said he was glad to be able to submit a statement more favourable than had been its immediate predecessors. They appeared to have arrived at the foot of the declivity down which they had been moving, they were now on the level, and he hoped were bracing themselves for the ascent immediately in front. The popularity of the meetings in Liverpool last year did the Conference an immense amount of good, and they looked forward to the same result being repeated in Glasgow, where there was every promise of the meetings being equally popular. They had not lost ground during the year, for there had been a considerable accession of members, overbalancing the defections and losses. The full effect of that accession of members was not to be seen this year, but would be next, and then there would be a still larger balance to their credit at the bank. During the year there had been several donations from various sources given quite spontaneously, including the very handsome one of £20 from the local committee at Liverpool. Of course they could not look to eleemosynary aid of any kind as a regular source of income; the Conference must depend on its own merits for its existence, but like any other society, they were open to receive, and were glad to receive, occasional assistance. The whole of the subscriptions had practically been expended on the *Year-Book*, and there had been no receipts at all from the Index, which seemed to show that a new one was required. Having referred more in detail to one or two items in the financial statement, he said he might as well take the opportunity of reporting on the Bell and Hills Fund, the working of which helped them to realize "the sweet simplicity of the three per cents." There was a certain sum invested which brought in a regular income, and about the same amount was expended in the purchase of books.

Mr. THOS. TYRER moved the adoption of the Report and Financial Statement. He certainly found the Index to the *Year-Book* most valuable, and hoped that a new one would soon be prepared. A meeting had recently been held in London under the auspices of the Royal Society to consider the question of making a collective index of the scientific literature of the world, so that really this matter was one of the first importance, and that from two points of view, the saving of time and labour, and the enormously increasing number of valuable and important works of reference. The Chemical Society and the Society of Chemical Industry were also preparing Collective Indexes. The Index, therefore, must be prepared, and of course it must be paid

for one way or the other. The best way of doing so would be by such an increase of members as would provide the funds without difficulty. He was glad to see that the *Year-Book*, although the Committee had been able to economise considerably in its production, would compare favourably with any of its predecessors, and their cordial thanks were due to those who had prepared it.

Mr. W. WARD seconded the motion, and said he agreed thoroughly with what Mr. Tyrer had said as to the value of the Index.

The PRESIDENT, in putting the motion, also referred to the Index, and hoped they would soon be in such a financial position, owing to the increased membership, set on foot without any difficulty.

The motion was put and carried unanimously.

THE UNOFFICIAL FORMULARY.

Mr. NAYLOR read a letter from Mr. Martindale, in which he suggested that as the new Pharmacopœia would probably be published before the next meeting of the Conference, the Unofficial Formulary Committee should be re-appointed, in order that it might consider it.

The PRESIDENT moved that the Committee be re-appointed which was at once agreed to unanimously.

The reading of papers was then proceeded with, the first being on:—

NOTE ON THE WORD ASAFETIDA.

By JOHN ATTFIELD, F.R.S.

Twice within the past fifteen years the writer has been called upon, in circumstances involving responsibility, to decide as to the orthography of the word "asafetida." Not himself a philologist, he has on each occasion sought the aid of authorities, with the following results.

In 1883 the word was found to be spelt "assafoetida" and "asafoetida," that is, with one "s" and with two, in leading books on pharmacy in Great Britain; the spelling of the latter part of the word scarcely being questioned at that time in this country. Lescher, *Pharmaceutical Journal*, June, 1868, drew attention to Déniau's monograph on "assafoetida," in which 600

authors had been consulted, and gave his own conclusions as to the etymology of the word, but did not touch its orthography. Miller, *American Journal of Pharmacy*, March, 1875—reprinted in *Pharmaceutical Journal*, March 13th, 1875—very fully discussed the orthography of the first portion of the word, the employment of one “s” being strongly favoured. He noticed the use of the word “asa” in *Pharmacographia*, then recently published, and referred to Flückiger’s treatment of “asa” in the *Pharmakognosie des Pflanzenreiches*, Berlin, 1867. Spelt “assafœtida,” in Latin and in English, in the British Pharmacopœia, 1867, it appears as “asafœtida,” in Latin and in English, in the British Pharmacopœia, 1885. From that date onward the spelling with one “s” has been adopted generally.

To turn now to the latter part of the word. In the Pharmacopœia of the United States of America, “assafœtida” in Latin and “assafetida” in English appears in the 1860 and 1870 editions, “asafœtida” in Latin, “asafetida” in English, in the 1880 and 1890 editions; that is to say, the diphthong “œ” was in that Pharmacopœia long ago displaced by the vowel “e” in the English word.

This continued publication in America of “asafetida” as the English equivalent of the Latin “asafœtida” raised the question in the writer’s mind as to whether or not it would be desirable for Britain now to adopt the same spelling. A reference to the “Oxford New English Dictionary” naturally followed, the parts already published including the first letters of the alphabet. There the following sentence was found: “Fetid. (ad. L., ‘fœtid-us’ [often incorrectly written ‘fœtidus’], f., ‘fêtère,’ to have an offensive smell).” This seemed not only to decide that the vowel “e” should displace the diphthong “œ” in the English spelling of the word “asafetida,” but at once to raise and decide the greater question of the orthography of the Latin word, which apparently could no longer be “asafœtida,” but “asafetida”; in short, that the “œ” was wrong and “e” right, both in the Latin and English words. Indeed, the only doubt was one arising out of the spelling of the initial word in the dictionary just mentioned, namely, “asafœtida,” here the diphthong being still retained.

A letter to one of the contributors to the dictionary, the Right Hon. Friedrich Max Müller, led first to an abortive attempt to find at the British Museum “a little book in which all these words are collected,” “œ” and “e” variants, as “ccena” and

"cena," a book in which, said this distinguished scholar, "you will find all the evidence in favour of 'fetida,' or 'fætida'; I should spell 'fetida'"; and secondly, to an introduction to the editor of the dictionary, Dr. Murray, who to a letter replied as follows:—

"During the Middle Ages, and down till very lately, much confusion prevailed in Latin MSS. and texts as to the diphthongs 'æ,' 'œ,' and the vowels 'ē ē' in many Latin words. Since the application of comparative philology to throw light upon Latin, a good deal has been done to clear up the matter. Thus 'cælum,' 'cœna,' which had been so long the accepted forms for 'heaven,' 'supper,' are now settled to be 'cælum,' 'cena.' In the case of the word you are dealing with, although all three spellings, 'fētīdus,' 'fætīdus,' 'fœtīdus,' occur in MSS. and texts, it seems to be concluded that 'fētīdus' is the more correct spelling, which, of course, gives 'asafetida.' See Lewis and Short, 'Lat. Dict.,' 1880.

"I am sorry that we did not know this when I prepared the A part of our dictionary, and that consequently we retained the time-honoured spelling 'asafætīda.' We have adopted 'fetid' as the form of the English adjective.

"I am sorry also that I do not know what the little book is in which the 'œ' and 'e' words are collected. I have never heard of it, but I must inquire about it and get it. Meanwhile I shall be glad to help you whenever I can. As you probably know, the Americans have begun to substitute 'e' for both 'æ' and 'œ,' even when these are etymologically correct, so that, for instance, all the 'hæmato-' and 'hæmo-' words are written 'hem-,' and all the 'rhœas' 'rhea.' I think that this is not British practice. In scientific terms we like to keep the diphthongs when they are etymologically correct, though they generally 'go' in popular words, as 'celestial,' 'European,' 'Grecian.'

"But in this case the question is whether Latin has really 'œ,' and the conclusion of scholarship seems to be that it had not, but that the spelling with 'œ' is a mediæval or renaissance mistake, probably after some false analogy.

"In Latin it is now known that 'œ' was a very rare diphthong, only occurring as an archaic spelling of 'u,' retained in some words, as *mœnia*. Of course, it was the regular Latinisation of Gr. 'oi,' and hence is common in Græco-Latin words like 'diarrhœa,' with which pharmacy abounds." After this authoritative statement, there can be little doubt that both in Latin and

in English the word in question will be spelt "Asafetida." In exact quotations from the older authors, their spelling of the word in question would probably be retained; but in such cases the context would prevent confusion.

Mr. JOHN MOSS asked if the author had gone into the etymology and meaning of other words beginning with "asa," indicating articles of materia medica. For instance, what did the prefix mean in the case of asarabacca? They all knew what it meant in *Asagraea officinalis*. The subject was a very wide one, and if Dr. Attfield went into everything in the Pharmacopœia with the same particularity as he had shown on this subject he did not know where his labours would end.

Professor REMINGTON said he considered that Professor Attfield had done American pharmacy probably as great service as he had done British pharmacy. On this question of etymology and orthography some correspondence had passed between Professor Attfield and himself. They would recollect that he had always had a controversy that the Americans were wrong on the subject of the word asafœtida and they would recollect that in some of the earlier editions of his "Chemistry" he advocated the use of the word "official." He needed to say a word in this connection. It probably would not be understood by British pharmacists why Americans used the word "officinal." There were some prejudiced people in America. They might take that with a grain of salt, but he said there were; and there happened to be quite a number in the pharmaceutical profession. Well, Procter held that so long as the Pharmacopœia of the United States was not officially prepared they could not use the word official altogether. But when the Pharmacopœia of 1890 was prepared, inasmuch as the Government had now adopted the United States Pharmacopœia as its standard, the pharmacists felt they had a right to use the word "official." He therefore wrote to his friend Attfield as soon as the Convention had decided that the case was won, and now they used the word officially. With regard to the use of the diphthong, he was not there to defend the radical views held on the other side of the world. For himself he was a conservative. He did not believe in these great changes, that they should interfere with the derivation of a word, or interfere with the great English language. They all knew the energy of Dr. Attfield even in a little thing, and while this might appear to be a small thing,

busy druggists desired to have as little to do with *assafœtida* as possible, yet he could say that little changes like this gave more trouble than many a more important matter.

Mr. DRUCE said he quite agreed with the propriety of Dr. Murray's later view, adopting the "e" instead of the diphthong. There was a very good instance of the old form of diphthong being dropped in the name of the Linnean Society. He should like to know how Dr. Attfeld would spell the botanical name "*cœruleus*," with "œ" or "æ"? There was an immense deal of time wasted in looking up words in an index through the confusion as to the use of these diphthongs. It had lately been pointed out that the name of the common blue pimpernel was spelt "*femina*" by the original describer (Miller) in 1768, and consequently in lists of English plants it would appear as *Anagallis femina*, in defiance of its orthographical derivation.

Mr. HOLMES said Professor Remington had very properly called attention to the difficulties which occurred in little matters of this kind. Even in the pronunciation of the word *asafetida* by the speakers present, there did not seem to be unanimity of opinion whether the "e" should be long or short, but the important question was, if the spelling of this word were altered, was it to be taken as a precedent, and how far was such a precedent to be followed? He had found, on looking at Dr. Murray's dictionary, that there was one more quotation of the word with "œ" than with "e."

Professor ATTFELD, in reply, said, with regard to words other than "*asafetida*" in which "asa" occurred, he thought Mr. Moss would find that Flückiger had very well treated the subject in the paper to which he alluded as having been published in 1867. He was obliged to Professor Remington for his kind personal words, also for his support in the spelling of *asafetida*, which of course was to be expected, seeing what was the practice in America with regard to the spelling of words with "æ" and "œ." He could assure them that Professor Remington spoke the simple truth when he said that gentlemen in the position he had to fill got worried, not so much by the big things as by the little things, and it was as well that such matters should be settled beforehand rather than afterwards. He did not himself pretend to be any authority on matters etymological, but he would be loyal to our great English philologists, such as Professor Max Müller and Dr. Murray, and when Dr. Murray expressed his sorrow that his initial word was spelt with "œ," he thought it was for them as

pharmacists unquestionably to follow him and other such men, especially when they were agreed. He did not think that Mr. Holmes need be afraid of any precedent being created in the matter so long as they had men like Dr. Murray to lead them, who very clearly distinguished between the many words, including the "œ" and the "æ," which he would not alter, as well as those which he would.

A vote of thanks was accorded to Professor Attfield for his valuable note.

In the absence of the authors, the next paper and the note following were read by Mr. Naylor:—

FURTHER NOTE ON THE PHARMACY OF CONIUM MACULATUM.

By E. H. FARR, F.C.S., AND R. WRIGHT, F.C.S.,

Pharmaceutical Chemists.

In the discussion upon a note by us on the strength of some of the official succi, read at the last meeting of Conference, the question of the standardisation of galenical preparations of conium was brought forward, and it was suggested by the President (Mr. Martindale) that our knowledge of the active principles of the drug was not sufficiently definite to admit of the standardisation of its preparations.

We reported to the meeting the ascertained willingness of Professor Cash, of Aberdeen, to conduct some experiments on the physiological action of conium, dealing more particularly with the question as to whether the action of a standard solution of conine, or of the mixed alkaloids of conium, was similar to that of a standardised galenical preparation of the same alkaloidal value. We undertook to have the work carried out, and to submit a report embodying the results to this Conference.

The following preparations and solutions were subsequently prepared by us, and forwarded to Dr. William Findlay, who performed the necessary experiments under the direction of Professor Cash:—

I. Fluid Extract of the Dried Unripe Fruits.—A pound of the fruits was reduced to coarse powder, and divided into four equal portions. One portion was moistened with 80 per cent. alcohol, and, after standing for an hour, was packed in a conical perco-

lator. More alcohol was added, and percolation allowed to proceed. A second portion of the fruits was treated like the first, an equal volume of the percolate from No. 1 being substituted for the alcohol in moistening the fruits, and also for the subsequent percolation. The third and fourth portions of the fruits were treated similarly—the percolate from No. 2 being used for the moistening and percolation of No. 3, and that from No. 3 for the extraction of No. 4.

Percolation was then carried on continuously until twelve ounces of percolate from No. 4, in three fractions of four fluid ounces each, had been collected. The marcs were mixed and submitted to pressure. The percolates and expressed liquid were assayed, and gave the following percentages of alkaloidal hydrochlorides :—

Fraction 1 =	.	.	.	.	.	3·37 per cent.
Fraction 2 =	.	.	.	.	.	·93 „
Fraction 3 =	.	.	.	.	.	·10 „
Expressed Liquid =	.	.	.	.	.	·07 „

In order to produce a standardised fluid extract for experimental purposes, the first fraction of the percolate was diluted with a sufficient volume of fraction 2 to reduce the alkaloidal strength to 2·5 per cent.

II. Solution of Mixed Alkaloids.—Three and a half ounces of the dried fruits were reduced to a fairly fine powder. This was moistened with 70 per cent. alcohol, and packed in a percolator. More alcohol was then added, and percolation carried on until a pint of percolate had been collected. This was acidified with dilute sulphuric acid, and placed in a retort, and the alcohol recovered by distillation. The acid liquor was allowed to cool, and was then poured into a stoppered separator. The alkaloids were extracted by the process previously employed by us, and were afterwards purified, being finally obtained in solution with a slight excess of hydrochloric acid. The solution measured about 100 cubic centimetres, and was found to contain 2·22 per cent. alkaloidal hydrochlorides. The alkaloids were again regenerated, and a solution prepared containing exactly 2·5 per cent. alkaloidal hydrochlorides.

III. Succus Conii Fruct.—A quantity of fresh unripe fruit, weighing two pounds, was well bruised, and mixed thoroughly with 10 fluid ounces of rectified spirit, and, after standing for six hours in a covered vessel, pressed. The marc was then moistened

with 9 fluid ounces of a mixture of rectified spirit, 1 part, water, 2 parts, and set aside in a covered vessel for six hours, when it was again pressed, and the liquid added to the first product, then set aside to clarify. The total product measured 32 fluid ounces, and on an assay yielded 70 per cent of alkaloidal hydrochlorides.

IV. Solution of Conine Hydrochloride.—1.96 grammes pure conine was placed in a stoppered cylinder with 50 cubic centimetres distilled water, a slight excess of hydrochloric acid added, and the volume made up to 100 cubic centimetres.

V. Solution of Conhydrine Hydrochloride.

VI. Solution of Pseudo-Conhydrine Hydrochloride.—These solutions were prepared in the same way as No. IV.

The conine was obtained from Messrs. Hopkin and Williams, and the other alkaloids from E. Merck.

PRELIMINARY NOTE ON THE ACTION OF CERTAIN PREPARATIONS AND ACTIVE PRINCIPLES OF CONIUM MACULATUM.

BY WILLIAM FINDEAY, M.A., M.B.

The following preparations were sent for experimental examination by R. Wright, F.C.S., Buxton, viz.:—Conium hydrochloride in solution (2.5 per cent.), a solution of the alkaloids in the proportions in which they occur in the unripe fruit (2.5 per cent.), conhydrine solution (2.5 per cent.), pseudo-conhydrine solution (2.5 per cent.), fluid extract from unripe fruit containing the various alkaloids to the amount of 2.5 per cent., and a succus containing 0.7 per cent. of alkaloids.

As a result of experiments on animals (guinea-pigs and rabbits), the same general action was observed as belonging to conine, the mixed alkaloid, and the fluid extract. Conhydrine and pseudo-conhydrine acted in an analogous matter, but comparatively large doses are required to produce any distinct effect.

The doses necessary to produce a lethal effect in guinea-pigs are about:—

Conine, .037 gramme per kilo.

Mixed alkaloids, .039 gramme per kilo.

Conhydrine, not less than 0.257 gramme per kilo.

Pseudo-conhydrine, certainly above 0.257 gramme per kilo.

The fluid extract has not yet yielded results exact enough to allow of tabulation with the alkaloids, but it may be remarked

that in experiments on frogs, in which the lethal sign is taken to be stoppage of the circulation, the activity of this preparation is as great as that of conine.

The succus, owing to its small percentage of alkaloids, proved rather inconvenient in attempts to compare it with much stronger bodies already noted; the experiments were consequently uncertain, as it was decided not to interfere with the bodies as forwarded.

The PRESIDENT, in inviting discussion, said it would be very interesting to hear the results obtained by any one who had worked in the same direction as the authors.

Mr. CONYNGHAM said that conium was a most important drug, and it was especially desirable that they should know what were its active principles, because it was used now in the treatment of diphtheria, a disease so fraught with danger that it was important that they should have reliable preparations of the drug or obtain the active principles. He hoped that one result of Messrs. Farr and Wright's investigation would be that they would never have any doubt as to the medicine not acting.

Professor ATFIELD said the difficulty in all these cases was to isolate the alkaloids that alone were active. To depend on the percentage of mixed alkaloids was to depend on something which might turn out to be unworthy of their trust.

Mr. DRUCE did not quite follow whether the different percentages of alkaloids were given in the paper for the respective parts of the drug. They wanted to know, first of all, whether the juice of the unripe fruit was stronger in alkaloids than the juice of the plant, or whether a preparation of the dry plant would not yield a larger amount of the alkaloid.

Mr. NAYLOR said that had been given in a previous communication of the authors.

Mr. BRODIE recalled a circumstance which happened to him as far back as the sixties. His employer, a medical man, was in the habit of prescribing tinct. conii, and he prepared it by percolation from the fruit. A 4 lb. parcel was ordered from a London firm, but on opening it up it was found to be different from what was usually got, instead of the ridges on the back it was covered with short spines. The parcel was laid aside till the representative of the firm called on his journey, when it was submitted to him, but he was unable to say anything about it, only that the question

was, Which is the proper thing? He then took it to Mr. Roger Kennedy, at that time a popular lecturer on botany in what was then known as Anderson's University, but he did not know it. However, on reference he found it to be the fruit of *Anthriscus vulgaris*.

Mr. NAYLOR replied that Mr. Farr was an accomplished botanist, and that he had collected the fruit himself, so that he could guarantee its authenticity.

MESSRS. FARR, WRIGHT and FINDLAY were warmly thanked for their papers.

The Conference then adjourned for luncheon.

On resuming, the following paper, in the absence of the author, was read by Mr. F. Ransom:—

SOME OBSERVATIONS ON ORGANOTHERAPY.

By J. C. McWALTER, L.R.C.S.I., L.A.H.I.

The classical experiments of Professor Victor Horsley have awakened a new era of medication, which Dr. Malcolm Morris recently described as one of the most remarkable achievements of the Victorian reign. The dominant idea is to supply from the healthy organs of some animal the deficiencies of the patient's secretory glands. This idea cannot claim to be a novel one; it is probably older than Aristotle, and even in their most savage state men seem to have had some intuition of the propriety of appropriating the healthy organs of the lower animals with a view to becoming imbued with their particular virtues. Thus we are told that certain African tribes fortify themselves for battle by partaking of the orchitic extract of the lion, believing that thereby they become infused with leonine valour.

All this is now ancient history, and it would be an impertinence to occupy the time of this distinguished assembly by referring to it, except as an introduction to some remarks on its effects on pharmacy.

Dr. Horsley's experiments proved that to graft the gland on the living animal produced the best results, but that to consume them as an ordinary article of diet was also efficacious, whilst even to cook them like ordinary meat did not destroy their virtues.

This evidence that the active principle of the gland, whatever it may be, is not of a protean or evanescent character, has unfortu-

nately stimulated manufacturing chemists to take extraordinary liberties with it, and to indulge in a series of vagaries as to the forms in which it should be dispensed to patients. Thus the glands were dried, powdered, mixed with some foreign substance, and compressed into pellets. They were macerated in varying proportions in glycerin, alcohol, and sundry other solutions, and the most diverse and contradictory reports as to their effects are constantly appearing in the medical papers.

In my humble opinion the compressed tablet form is about the worst possible to elicit the virtues of the gland. I believe it to be a blunder to dry it, a worse blunder to powder it, and a grievous error to mix it with any other powder, whilst to compress the product is to still further attenuate the chances of the active principle entering the system. I believe that the various serious symptoms which physicians have found to follow their administration were due to various poisonous toxalbumins generated by the action of moist air on the tablets.

If there be any animal extractive used in medicine of which we have anything like an adequate acquaintance, it is pepsin, and this ferment owes its present pre-eminence to the unselfish labours of pharmaceutical investigators, who have constantly striven to elaborate the active product, and to free it from inert, nauseous, and harmful constituents. If, therefore, any manufacturing house were to offer us a tablet, and state that it was equivalent to five grains of a fresh pig's stomach, surely we would laugh it to scorn. Yet have we not firms, boasting to represent the newest and most elegant pharmacy, claiming no more for their tablets than that they represent an equivalent of another gland? I fear, gentlemen of the British Pharmaceutical Conference, that the responsibility for this state of affairs is in some measure due to the fact that you have allowed your proper functions as pharmacists—to elicit, abstract, elaborate and make elegant and effective the various remedies which the medical profession may wish to investigate—to be usurped by some large commercial firms. These houses seem to have monopolised for the moment the ear of the profession, whilst they hypnotise chemists by their stories of research laboratories, scientific staffs, unrivalled facilities, etc., and paralyse pharmaceutical criticism by the prices they pay to the press.

It may fairly be asked whether I have any better method to suggest for the exhibition of animal extracts than the compressed concoctions which I have just condemned? Without claiming to throw much light on the subject, I would premise that in

administering glandular remedies, we seek to copy a physiological process, and therefore we should be guided by what takes place normally in the organism. Now the process of secretion in any gland may very roughly be considered as an osmosis—that is certain constituents of the blood are elaborated and allowed to filter through, by means of a differentiated epithelium and a basement membrane.

Copying this process then, I suggest that the proper plan to extract the active principles of animal organs is, to remove them immediately on the death of the animal, so that the molecular life of the organ may, if possible, be preserved, and at once macerate them in a sterilised solution of glycerin, made alkaline or acid according to the nature of the gland. Thus, for the pancreas one would use an alkaline solution, and for the stomach a slightly acid one.

The resulting solution should afterwards, I submit, be subjected to a process of dialysis which, as a method for extracting the active principles of drugs, is I believe of great value, and its employment in the preparation of animal extracts will be found very useful in separating the colloid constituents, and obtaining a close approximation to the active principle.

Since the demise of Dr. Brown-Séquard, and the introduction of the tablet form, the orchitic extract has fallen into disrepute, but it will probably be found of great use, especially in cerebral cases, when a really active extract shall be produced. The method which I advocate for the preparation of this is to macerate fresh sliced glands in a solution containing 30 per cent. of glycerin, and 0·6 per cent. each of chloride of sodium, phosphate of sodium and bicarbonate of sodium. The same solution will probably be found the best solvent for the ovarian extract, though the virtues of this are much more dubious.

Extract of red bone marrow is best made, I think, by macerating the fresh marrow in glycerin. The effects of this preparation, when well made, are little short of marvellous, and it is well worth the investigations of physicians and pharmacists.

The experiments of Claude Bernard have proved that post-mortem changes in animal organs go on with such rapidity that for a very long period an unchanged organ seems never to have been investigated, hence the importance of asepsis in the preparation of these remedies, and the necessity of preserving them from such changes by their immediate immersion in some such preservative fluid as glycerin.

Gathered here to-day is the *élite* of pharmacists in Great Britain and Ireland, which proves by its presence its desire to lift itself above the level of mere money-grabbers, and to do some real service to suffering humanity. Proud shall I be if any feeble words of mine can induce them to investigate the properties and preparation of animal extracts, and to rescue them from those traders whose chief desire seems to be to reduce every organ and tissue of the body to their own special pill, pellicle, pellet, or potion, no matter how obviously unsuited such may be to present in its full potency the remedy sought after.

The PRESIDENT said this was a subject in which he was sure all were interested, and he was sorry the author was not present to answer any remarks that might be made. The author seemed to believe in the preservative properties of glycerin, but he (the President) had been rather disappointed in the use of glycerin for preserving pepsin. It was quite pleasant to find that there was a tendency among some members of the medical profession to see that every active medicinal substance could not be put up in tablets, and be administered as though it were the most efficacious form.

Mr. MARTIN said as to glycerin extracts, his experience was that they were extremely successful, and that that was a proper method of exhibiting such remedies. He quite believed that a great many of these organic substances that were now in use were tentative, and that their use was largely due to the way in which they were advertised; but he was quite of the opinion that organotherapy had come to stay. He had seen many cases in which certain specific glands had been found of great service—as, for instance, the thymus and the thyroid. He was also able to state that a red-bone medulla was a remedy of value, and when it was carefully dried under proper aseptic conditions, was better administered in that way than in any other.

Mr. BIRD said the chief point seemed to be that in drying, the active principle of these animal substances seemed to undergo some change. The only way to get at the truth of the matter would be to try practical experiments side by side; treat one portion with glycerin, and the other portion in the usual manner by drying to powder.

Mr. PETER MACEWAN pointed out that these statements by Mr. Martin and Mr. Bird were entirely at variance with what Dr.

McWalter had brought before the meeting. He seemed to have overlooked the fact that the recommendation to dry the thyroid under proper aseptic conditions came, he believed, from one of their most eminent therapeutists, Professor T. R. Fraser, Edinburgh, and since that suggestion had been taken up by several firms it had been fully tried in medical practice—by, amongst others, Dr. Murray, of Newcastle—and the general opinion was that in this particular form the thyroid, at all events, was decidedly active. That method of administration had been found to be better on the whole than the one which was first introduced by Dr. Murray—viz., subcutaneous injection of the glycerine solution. He did not think the administration of dried thyroid had prevented investigation regarding the active constituents of the gland, and they knew already that at least two active principles had been isolated from it which were more or less associated, for both substances seemed to be iodine derivatives of some albuminoid body. Still the general opinion was that they were not quite the same in action as the whole thyroid. From the statements made by Mr. Martin and Mr. Bird, he did not think that Dr. McWalter's assertions were altogether justified, and it was to be regretted that he was not present to bring forward some facts in support of the very strong statements he had made.

Mr. STANFORD said there was no doubt whatever that there were at least two, if not more, principles in the dried gland. He could corroborate what Mr. Martin said, that the dried preparation was active if it was very carefully and properly dried. Then it must not be forgotten that the dried gland would contain anything that might be accidentally in the original gland, therefore it might be just as dangerous as using the raw preparation. They still needed some manufactured chemical product of the gland which did not contain anything deleterious that might be contained in the original gland.

Professor ATTFIELD asked if Mr. Stanford could give them any hope that such a thing would be produced?

Mr. STANFORD replied that he could not promise anything just yet.

Mr. LEO ATKINSON pointed out that the gland itself might vary very considerably. The information he had received tended to show that the glycerin preparation was the most effective.

Mr. STANFORD said the weight of the thyroid gland differed enormously, sometimes as much as 100 per cent., and at different times of the year it varied very much in appearance, and probably

in the quality of its constituents. Some years ago he pointed out that he had discovered iodine in every marine animal he could get at, and in most marine vegetables; but it did not then occur to him to look for it in the throat of a sheep, and he could not at all tell even now where it came from.

The PRESIDENT, in moving a vote of thanks to the author, whose absence they all regretted, pointed out that they were not here dealing with a definite chemical compound, and it would probably require years of further experience before any very positive conclusions could be arrived at.

Dr. McWALTER's reply will be found on page 380.

The next paper was read by Mr. J. C. Umney on:—

FURTHER OBSERVATIONS ON COMMERCIAL OIL OF CITRONELLA.

By JOHN C. UMNEY, F.C.S., AND R. S. SWINTON.

In their report for October, 1895, page 18, Messrs. Schimmel & Co. called attention to the adulteration of three samples of citronella oil with substances that did not affect their solubility in three to five volumes of 80 per cent. alcohol, but caused them to turn cloudy on the addition of further alcohol, and caused a precipitate of a foreign substance at the bottom of the flask.

This deposit they stated did not consist of petroleum, but probably of East Indian gurgun balsam or wood oil, the exact identification being prevented by the smallness of the samples.

Subsequently one of us described (*Chemist and Druggist*, March 7th, 1896) several samples having similar characters met with on the London market, at the same time pointing out that the adulterant, if a wood oil, was not the ordinary gurjun oil, for neither did the oil itself, nor did any part of it, give Flückiger's reaction for that substance. Since that time doubts have been raised as to the sophistication of these oils, as the nature of the adulterant, if any, could not be determined.

The characters of these, as well as of several more of the same class of oils, which we have termed A, subsequently examined were:—A specific gravity as high as $\cdot 910$ at 15°C ., and an optical rotation as high as -14 in a tube of 100 millimetres, and slight deposition on treatment with five volumes of 80 per cent. alcohol.

This specific gravity is slightly higher than those obtained in 1891 (*Ph. J.* [3], vol. xxi., p. 322); from a comparison of many samples which represented practically the whole of the oil of citronella at that time met with in commerce in London, no oil amongst those then examined having a specific gravity exceeding 0.897. All of these oils differed markedly from the oils distilled by two English firms, Messrs. Fisher and Messrs. Winter & Son, in Singapore and Galle (Ceylon) respectively.

These oils, which we have termed class B, have the following characters:—

Specific gravity at 15° C., 0.886 to 0.889.

Optical rotation in a tube of 100 mm., -4 to -6.

Readily soluble in 80 per cent. alcohol.

It seemed therefore desirable to thoroughly investigate the differences existing between these two classes of oil, and to determine whether they were due to sophistication of those first referred to (class A), or to a difference in the method of distillation of the latter (class B), by which certain of the constituents of the oils were eliminated.

We have addressed letters to the two firms mentioned on the subject of the method of distillation adopted, but although several months have elapsed, up to the present time have not received replies. We learn, however, from two independent sources, that the oil is not in the ordinary way distilled by steam, and that practically no differences exist in the grasses used for distillation. It is distilled in all cases from freshly cut grass, or grass cut within three days, as it is found that if the grass be left for more than the fourth day the yield of oil is not great enough to cover the distillation expenses.

The most important constituents which have hitherto been recognised as present in pure oil of citronella are camphene, dipentene, citronellaldehyde, methyl heptenone, geraniol, acetate of geraniol, and borneol, all the physical and chemical characters of which have been worked out with almost complete exactitude. A difference in the relative proportion of these constituents, the characters of which vary very much, would account to some extent for difference in the oils, but the only body that would materially raise the specific gravity, would be a considerable quantity of acetate of geraniol (specific gravity 0.917).

Saponification showed that the proportion of esters did not exceed 5 per cent. in either the oils in class A or class B, and therefore the specific gravity of over 0.900 could not be due to geraniol

acetate, as the other bodies present in large proportion have specific gravity lower than 0.885.

A considerable quantity of an oil of class A was therefore submitted to fractional distillation in a current of steam, fractions being collected corresponding to the following proportions:—

First fraction	7.9 per cent.
Second „	15.2 „
Third „	7.4 „
Fourth „	4.4 „
Fifth „	7.2 „
Sixth „	4.9 „
Seventh „	4.3 „
Eighth „	5.7 „
Ninth „	6.0 „
Residue „	37.0 „

The fact that this residue could only be distilled with the very greatest difficulty with steam suggested the probability that if the oils of class B were steam distilled, this fraction would not in all probability be present in the oil.

Submitted to fractionation with steam under precisely similar conditions, practically the whole of the oils of class B were readily distilled, thus making it evident that herein lay the very considerable difference between the oils of the two classes.

The residue of the oil of class A, amounting to 37 per cent. of the whole oil, was submitted to extended examination. It was distilled, refractionated under a reduced pressure of about 60 to 70 mm., and was then found to distil at ordinary pressure between 245° and 280° C. It still contained, however, traces of geraniol as indicated both by the odour and by acetylation, and was therefore purified by repeated fractionation and distillation over sodium, until the metal remained practically bright throughout the whole process.

This body, which has all the character of a sesquiterpene, does not agree, either in physical characters or in chemical reactions, with any of the hitherto described bodies of that class, of which the most important are cadinene, caryophyllene, clovene (see *Ph. J.*, vol. xxiii., p. 382), and the recently described humulene (Chapman, *Journ. Chem. Soc.*, 1895, p. 54). We are studying these characters and chemical combinations, but it is only necessary in this connection to point out that it is odourless, and consequently a valueless constituent of the oil.

It is, moreover, not nearly so soluble in alcohol of 80 per cent.

strength as geraniol and citronellic aldehyde, and therefore materially affects the solubility of the oil. It is also quite devoid of optical rotation, and has a high specific gravity.

In a previous paper (*Chemist and Druggist*, March 7th, 1896), we have referred to the percentage of acetylisable bodies indicated by saponification, which fell as low as 50 to 52 per cent., calculated in terms of geraniol in some of the oils of class A. We have at the same time found that the percentage of acetylisable bodies in all the samples of the oils of class B are as high as 90 to 92 per cent. We are now able to attribute this difference to the presence of quantities of this sesquiterpene in the oils of class A to the extent of from 20 to 30 per cent., and it is quite evident that the percentage of acetylisable bodies is much reduced by the presence of this body.

It should be borne in mind that the acetylisable bodies present include borneol, and also are influenced by the proportion of citronellic aldehyde present.

The difference in the rotatory power of the two oils being unexplained by the presence of the sesquiterpene, owing to its optical inactivity, the first fractions of the oils were carefully examined with a view to determining the proportions of terpenes present and their nature.

The first 6 per cent. of each of the oils was carefully collected after repeated fractionation, and in the case of A it boiled below a temperature of 170° C., and had an optical rotation of -42° in a tube of 100 mm., and after distillation over sodium, the optical rotation was found to be as high as -52° .

The specific gravity of this fraction was 0.859 at 15° C.

These characters do not correspond with camphene, the optical active terpene hitherto recognised as present in citronella oil; and as the absence of borneol was proved by the boiling-point of the fraction and freezing, it points to the presence of a strongly lævoro-rotatory terpene other than camphene.

The absence of anything more than traces of camphene and borneol in this fraction was confirmed by acetylation, camphene being converted by this treatment into iso-bornyl acetate and borneol into the corresponding ester; saponification showing that only traces of these acetyl absorption bodies were present.

In contra-distinction to this, the corresponding fraction from class B oil had an optical rotation of only -11° in a tube of 100 mm., and after acetylisation and saponification, over 90 per cent. acetyl absorption bodies was indicated, showing that the

highly optically active terpene of class A oil is nearly, if not altogether, absent from those of class B. The range of boiling-point was considerably higher, being up to 190° C., and there can be no doubt that this terpene is the cause of the higher optical activity of the former class of oils, and that it has either been fractionally removed from the oils of class B, or does not exist.

These results, we think, point to the conclusion that (1) The native-distilled commercial oils (class A) differ from those distilled by English firms (class B) in containing a highly optically active terpene, which raises the optical rotation, and a large percentage of sesquiterpene which raises the specific gravity, the presence of which constituents reduces the odour value and impairs the solubility in alcohol.

(2) That the oils of Messrs. Fisher and Winter respectively are possessed of approximately 30 per cent. greater odour value than most native-distilled commercial oils.

As we have already stated, we are thoroughly investigating the characters of the sesquiterpene which we have separated.

The PRESIDENT said this was a most interesting paper from a gentleman who was becoming quite an authority on the essential oils.

Professor ATFIELD said there could not be very much discussion on this paper, considering that the author, as the President had said, was himself the great authority on the subject. Still, they could not let it pass without a vote of thanks, and one point, the isolation of a sesquiterpene having such an extremely high boiling point, and without odour, was of exceptional interest; its further investigation would be looked for anxiously, not only by pharmacists, but by medical men and scientific chemists.

The PRESIDENT asked if Mr. Umney could inform them whether, in the distillation of the oil by the English firms in the East, the oil was carried over by steam passing through the liquid, or was merely distilled by steam heat in a jacketed pan? If the former plan were followed, no doubt the steam would carry over with it substances which would only boil at a higher temperature than if distilled by the application of the same amount of heat outside.

Mr. BIRD asked if the sesquiterpene was freely soluble in alcohol.

Mr. UMNEY said no, not freely; he called it slightly soluble. When he came to this difficulty, he wrote to the two firms having

factories at Singapore and in Ceylon, and asked them as to the methods of distillation used, but they had not thought fit to reply. He had taken a great deal of trouble to obtain information as to native-distilled oils, which he was satisfied were not in any way adulterated, and were perfectly natural oils. He had recently had occasion to examine some lavender oils distilled by steam instead of fire heat, and found it was infinitely superior to the old oil distilled by fire heat at Mitcham and elsewhere. The oil he had examined was distilled by Sir Walter Gilbey from plants grown on his estate in Essex, where he was trying what could be done to relieve agricultural distress by the cultivation of peppermint, lavender, fruits, etc.

The authors were heartily thanked for their communication.

The following paper was then read:—

THE PHARMACEUTICAL VALUE OF SUMATRA BENZOIN.

BY THOMAS DUNLOP, PH.C.

My attention was particularly drawn to the subject of this paper in the autumn of last year. When making simple tincture of benzoïn the amount of barky matter left on the filter was so considerable that I dried it, and found that it constituted over 22 per cent. of the benzoïn taken. To find whether this was exceptional, I procured commercial samples from various sources, and the results were such that I deemed them of sufficient importance to bring before the members of the Conference.

Before doing so, however, I will briefly quote the description of benzoïn given in standard works on materia medica, from which it will be seen that, although the presence of impurities is noted, the extent to which that may occur is not defined. In one work only, Christison, is the percentage of impurity stated, and in one case only, the B.P., is the presence of impurity unnoted.

Christison describes benzoïn as of "two sorts, commonly called First and Second, or Fine and Coarse. Each dissolves entirely in Alcohol, Rectified Spirit, and Ether." The "coarse" sort only differing from the "fine" apparently in containing "1·6 of extract and impurities." The compositions being given as:—

Fine.		Coarse.	
Resin	80·7	Resin	78·5
Benzoic Acid	19·8	Benzoic Acid	19·7
Moisture	·2	Extract and Impurities .	1·6
Total . .	100·7	Total . .	99·8

Pharmacographia says :—" Each sort occurs in different degrees of purity, and under considerable differences of appearance. (In) Siam benzoin there is always a certain admixture of bits of wood, bark, and other accidental impurities. (In) Sumatra benzoin the mass, when the drug is of good quality, consists of numerous opaque tears set in a translucent greyish-brown resin mixed with bits of wood and bark. When less good the white tears are absent, and the proportion of impurities is greater. Sumatra benzoin usually falls short of the Siam drug, and hence commands a much lower price."

The solubility and chemical composition, however, describe an absolute drug—a thing not to be met with commercially in that of Sumatra—no further notice being taken of the impurities that are admitted to be "always" present, and no distinction being made between the two varieties.

The *U.S. Dispensatory* says :—" Siam benzoin is mixed to a greater or less extent with bits of bark, wood, etc." "Sumatra benzoin, bits of wood, etc., more abundant."

Maisch (5th edit.) says :—" Inferior kinds sometimes contain a large percentage of chips."

The B.P. (1885), although it does not specify Siam and Sumatra as sources of benzoin, practically describes these varieties, and in its "characters" of the drug, that of Sumatra is specified in the words "or greyish-brown translucent substance," descriptive of the agglutinating material of the tears. It, also, only indicates an absolute drug in stating its solubility—nothing being said of a residue being left when it is treated with rectified spirit or solution of potash.

Attfeld (6th edit.), 1875, shows that the drug may contain 10 per cent. of impurity, his figures being :—

Benzoic acid from	12 to 15 per cent.
Resins	78 „ 84 „ „
Totals . .	90 „ 99 „ „

Whilst in the 15th edition, 1893, he merely mentions benzoin as a source of benzoic acid (which is again given as 12 to 15 per cent.), with the additional statement, "the rest being mainly composed of two resins."

Lastly, as a contrast, in the "Market Report" of the *Pharmaceutical Journal* descriptions like the following occur:—

"SUMATRA GUM.—Good seconds with nice clean almondy centres but slightly false packed corners"; or, "Fair quality with pale centres but rather false packed sides"; or, "Ordinary ditto with fair centres but very barky sides." From which it appears that this variety is systematically doctored commercially, and investigation shows that the Sumatra benzoin of commerce agrees with the commercial rather than with the pharmacological standard.

For the sake of brevity and lucidness I have tabulated my investigation, and before you are the samples examined and also the residue left by each.

In Table I. details are given of the samples examined with results.

In Table II. the samples are arranged in numerical order of the residues.

In Table III. the samples are arranged in price order, with corresponding residue value.

TABLE I.—*Details with Results*

No. of Sample.	Price.	Labelled.	Residue in grs. from 1 oz. of drug.	Percentage of impurity.	Grs. reqd. for 1 oz. soluble matter.	Remarks.
	<i>s. d.</i>					
1	2 8	—	97	22·17	562	Second quality.
2	2 6	—	132	30·	625	Only quality. Described as white—fine.
3	3 8	Opt.	35	8·	475	Highest price.
4	3 6	Elect.	100	22·85	567	Described as "Elect."
5	2 6	Opt.	120	27·42	602	Second price.
6	3 6	—	48	10·9	491	Highest price.
7	2 6	—	100	23·85	567	Only quality.
8	2 3	Opt.	126	28·8	614	Best quality.
9	1 5	—	56	12·8	501	Second quality.
10	4 0	Opt.	76	17·37	529	Highest price.
11	3 4	Opt.	70	16·	520	"
12	3 6	Opt.	64	14·62	512	"
13	6 0	Siam	5	—	—	"

Those with a blank were labelled "Gum Benzoin" only.

TABLE II.—*Numerical Order of Residues.*

No. of Sample.	Residue.	Percentage.	Price.
			<i>s. d.</i>
13.	5 grains	—	6 0
3.	35 "	8	3 8
6.	48 "	10·9	3 6
9.	56 "	12·8	1 5
12.	64 "	14·62	3 6
11.	70 "	16	3 4
10.	76 "	17·37	4 0
1.	97 "	22·17	2 8
7.	100 "	22·85	2 6
4.	100 "		3 6
5.	120 "		2 6
8.	126 "		2 3
2.	132 "	30	2 6

TABLE III.—*Price Order with Residue Value.*

No. of Sample.	Price.	Residue.
	<i>s. d.</i>	
9.	1 5 per lb.	56 grains
8.	2 3 "	126 "
7.	2 6 "	100 "
5.		120 "
2.		132 "
1.		97 "
11.	3 4 "	70 "
6.	3 6 "	48 "
12.		64 "
4.		100 "
3.		35 "
10.	4 0 "	76 "
13.	6 0 "	5 "

The conclusions to be drawn from these are :—

(a) That Sumatra benzoin contains from 8 to 30 per cent. of barky and woody matter (*vide* Table II.).

(b) That the price paid for the drug is no criterion of the quality (*vide* Table III.).

(c) That if this variety be used pharmaceutically, it should be previously estimated, so that the proper allowance may be made for impurities; and

(d) That in the forthcoming B.P. more accurate statements should be made regarding the actual "characters" and "solubility" of this drug.

For comparison I procured one sample of Siam benzoin, which I found to be "practically *entirely* soluble" in rectified spirit, the residue only amounting to 5 grs. per ounce.

I would also direct attention to the fact that, although the low price and greater solubility of No. 9 may seem in its favour, it proved to be Palembang resin, so that it is unsuitable for making even an unofficial tincture. A noticeable feature of the tincture made from it was that it took ten hours to filter 3 ozs.

The following considerations prompted me to take up this subject :—

1. I could find no authoritative information on it. I have dealt with this in the introduction.

2. I could find no literature on it. I have only come across two references, both foreign. The one in the *Amer. Journ. of Pharmacy*, fourth series, i., 485, where A. C. Curtis, in "Notes on Benzoin," says: "6. A known quantity of seven of the samples was treated with alcohol. The undissolved residue dried and weighed gave an average of 21 per cent. of soluble matter." The other, in the *Pharm. Journ.* of May 1, 1886, in a letter from Pocock & Co., Capetown, giving the comparative assay of a salvage find of resin, 195 years old, with that of elect benzoin at that time. It says: "Having thoroughly exhausted the resin with S.V.R., we found it left 7·7 per cent. of wood, etc.; whereas a sample of 'elect' benzoin, as found in commerce at the present day, similarly treated, yielded no less than 34·9 per cent. of woody matter."

3. The fact that Sumatra benzoin is always supplied when benzoin is ordered. This only requires to be mentioned.

4. The therapeutic importance of the drug. Although Christison says, with reference to its "expectorant and specific properties in chronic pectoral complaints," that "its reputation has greatly declined of late years," and *Pharmacographia* says, "it appears to be nearly devoid of medicinal properties, and is but little used," in modern practice it is esteemed as an inhalation in the treatment of congestion of the pharynx and larynx, and is recognised as one of the best remedies for nasal catarrh, hence the necessity for having a full strength *tr. benzoin co.*

Were it "nearly devoid of medicinal properties" the question might well be asked, "Why is it retained in the Pharmacopœias, seeing it is not the recognised source (on the large scale) of benzoic acid, which is its principal constituent?"

The PRESIDENT said this was a thoroughly pharmaceutical paper, and reflected great credit on the author. It showed how among the simpler drugs there were many which might be useful as forming the groundwork for a paper. The supply of drugs, as far as impurities were concerned, very largely depended on the demand; anything which tended to increase the demand for a better quality drug would tend to increase the supply of that quality.

Mr. UMNEY said the description that the author had given from the Trade Report of the *Pharmaceutical Journal* showed practically the condition in which the benzoin was received here; it then had to be broken and picked by wholesale dealers, a matter of great difficulty to druggists. The author had referred to Sumatra benzoin being always supplied and not Siam, but he (Mr. Umney) thought that the Siam was always in the list, though the Sumatra was more in accordance with the Pharmacopœia. He was not sure that he caught Mr. Dunlop's words correctly, but he understood him to say that benzoin was not the general source of the benzoic acid of commerce. This was incorrect, and Mr. Tyrer would doubtless say so.

Mr. DUNLOP said his expression was "on a large scale."

Mr. TYRER had no hesitation in saying that the concluding sentence of the author seemed to be entirely misleading in face of the facts. If that was Mr. Dunlop's query, he should be glad of the opportunity of disabusing his or any one else's mind who had the same impression. As he understood the question, why was it retained in the Pharmacopœia seeing that it was not a recognised source on a large scale of benzoic acid, which was its principal constituent? He wished to say that it was the source of benzoic acid. He would further remark that he knew of no instance in which the sophistication of toluol benzoic acid had been used without detection, and he had good reason for knowing that it was not substituted in any degree, or mixed with the benzoic acid derived from gum benzoin. Without going into the question of the varieties of the gum benzoin, it was legitimate to use any gum benzoin of any kind or quality for the extraction of that which was its medicinal agent. It was quite another thing whether one gum might be substituted for another; that was a question of pharmaceutical ethics. Benzoic acid as used in this country was derived from gum benzoin.

Mr. MACEWAN thought the paper was of very great importance, especially to retail traders. No doubt most wholesale men were

aware that such a condition of things existed. During the past six or seven years a good deal of work had been done commercially and chemically in respect of the benzoin. In the first place, regarding the Sumatra benzoin, it was perfectly well known that the Chinese merchants, in whose hands this trade was, systematically manufactured it. They got it from native collectors and mixed it with other resins, woody matter, and so on, and prepared benzoin very largely to suit the price obtainable for it in London. Any one who walked through the drug-warehouses there could not help noticing the extreme variability of the drug—it was a mixture. That led to the obvious conclusion that solubility *per se* was not altogether a reliable test, because all that was dissolved was not benzoin. One might dissolve some of these worthless resins added to it. That was why the contributions with regard to benzoin from Lüdy, Tschirch, and Dieterich came in. Dieterich, following Lüdy's investigations, had systematically determined the saponification number, ester number, and acid value of benzoin, as well as the solubility, and his experiments on the last point confirmed Mr. Dunlop that the best benzoin should not contain more than 10 per cent. of insoluble matter. Lüdy's experiments showed that Sumatra benzoin contained ten bodies—viz., free benzoic acid, free cinnamic acid, styrol, vanillin, benzaldehyde, benzol, styracin, cinnamic-phenyl-propyl ester, benzo-resinol benzoic ester, and benzo-resinotannol benzoic ester—the last two bodies constituting the chief part of the resinous matter. The same chemist found six constituents in Siam benzoin—viz., benzoic acid, vanillin, styracin, benzoic ester, benzo-resinol benzoic ester, and siarresinotannol benzoic ester, the last two being the "resin." Lüdy added that Siam benzoin contained 38.2 per cent. of benzoic acid, free and combined—a much larger proportion than was generally allowed. As the benzoin differed in composition, so they might differ in action. From that statement would be seen the real importance of the paper, because that was the first time for many years that any British chemist had approached the matter in this way, and it was really time that they had it decided what benzoin was to be used in medicine. No pharmacist who had a true appreciation of his work would take advantage of the slight ambiguity in the Pharmacopœia—which did not definitely prescribe Sumatra, the wording showing that they might use the Siam. The latter was a soluble resin, had a fine aroma, and was in every way better.

Mr. SEYLER said on lately examining into the subject, the first

difficulty he encountered was as to the kind of benzoin to choose. He finally decided to take a good price Siam benzoin, and found it contained 17 per cent. of insoluble matter; it was chiefly woody matter. In the Pharmacopœia there were not sufficient directions as to the kind of benzoin intended to be used. In the tincture he prepared himself he found $17\frac{1}{2}$ parts per 100 volumes of solid residue. Dr. Hill, of Birmingham, had found 18. He had himself determined the ester acid and the saponification number, and to that he had added the iodine number, which he had found to be useful. There was very little available literature on the subject. One wanted to make a separation between the benzoic acid, resin and the neutral esters which were present. He thought it was high time that the subject was looked into by pharmacists, and he welcomed this paper as a very valuable and interesting contribution on the subject.

Mr. HOLMES said the importance of this paper lay in the attention it called to the variation in the quality of drugs. The wording of the description of many drugs was ambiguous, and it was very difficult to lay down a limit as to quality, but it seemed to him that in medicine only the highest qualities should be used. There was plenty of employment for lower qualities in other directions. Siam benzoin occurred in distinct tears, which had very few impurities, and getting the best kind was merely a question of price. With regard to benzoic acid being the principal constituent, he did not think it was ascertained how far the properties of benzoin as a remedy were due to other constituents. The benzoic acid of commerce might be derived from benzoin, speaking of the English article, but he would ask those in the wholesale trade whether there was not a considerable quantity manufactured on the Continent or elsewhere, not obtained from benzoin, but simply flavoured with it. Some years ago, in the India Museum, he saw a sample labelled benzoin, looking very nice indeed, but on careful examination he found the white tears in it were really a mineral, either steatite or sulphate of calcium, but which of the two he could not recollect.

Mr. DRUCE said benzoin had two principal uses—one in medicine, and the other as a perfume for incense. For the latter purpose there was no doubt that the Siam was the more agreeable, giving a pleasanter perfume, and being less irritating. The simple tincture of benzoin from Siam was more agreeable than the Sumatra benzoin, but he was not certain whether for inhalation the more impure article from Sumatra, after the impurities had been

removed, was not the better. As Mr. McEwan had pointed out, the two differed greatly in chemical constitution. Some years ago, in an old chemist's establishment, he found a large parcel labelled "Siam benzoin," which contained something which was not benzoin at all, but gum acroides, the product, he believed, of an Australian plant, which contained benzoic and cinnamic acid. Whether the substitution was an accidental or intentional one there was no means of ascertaining, as it had been there many years.

Mr. McEWAN said he had ascertained about fifteen years ago that large quantities of gum acroides were used in making sealing-wax, but that was a trade secret.

Professor ATTFIELD, after referring to the interesting character of the paper, said it put the question, Why was benzoin included in a Pharmacopœia? The answer might easily be given. In the first place, it was the source of benzoic acid, as had been stated authoritatively. It was equally well known that this acid had been obtained artificially, and one could imagine that in certain places a mixture was to be found on the market. Benzoin was also a source of antiseptic resins, a fact utilised in making benzoated lard, the whole efficacy of which was probably not due to the benzoic acid, but also to the odoriferous substances present. Two speakers had raised the question of the medicinal value of this article, but he did not know that its answer properly came within the province of the Conference. They must assume that medical men would not make use of such a drug on a sufficiently large scale to entitle it to recognition without good grounds. With regard to the characters indicated in a pharmacopœia, it was being recognised that pharmacists were becoming better educated, and that as a consequence less, rather than more, pharmaceutical detail need be included in a description, especially in dealing with the qualities of substances which could not be well defined either chemically or physically. The particular odour of benzoin would possibly come under that class. Again, with regard to insoluble matter in benzoin, a Pharmacopœia could not recognise any proportion at all. Benzoin was generally stated to be soluble in rectified spirit, and it was not possible or desirable to go much farther, and say anything as to the exclusion of bark or anything of that kind. Here came in the value of this paper, not from a therapeutical point of view, which they could not expect, but as an aid to practical pharmacists in carrying on their business, such commercial aid as was not only useful, but essential, though such

as must not be looked for in full detail, and always, in a pharmacopœia.

Mr. COLLIER said benzoin was largely used as a surgical application in the form of the compound tincture, as the old friar's balsam used to be. At Guy's Hospital they used some gallons of it in the course of the year, though they never used benzoin internally. Benzoic acid was also used in various forms, so there was quite a sufficient reason for including it in the Pharmacopœia.

Mr. DUNLOP, in reply to Mr. Umney's remark as to purity being simply a question of price, said the retail chemist, in buying Sumatra benzoin, had no guarantee whatever of the quality; he might pay four shillings, and get no better an article than if he paid half a crown. This concluding query was suggested by two things: In the first place, a statement in Fownes' *Chemistry* that hippuric acid was the source of benzoic acid on the large scale; and secondly, the relation between the commercial price of benzoic acid and the price of benzoin. At the present time, taking the cheapest sample quoted at 1s. 5d., it would require $6\frac{1}{4}$ pounds of benzoin to give 15 ozs.—assuming that it yielded the maximum of benzoic acid. Now $6\frac{1}{4}$ pounds at 1s. 6d. would be about 9s., and benzoic acid was quoted at 6d. an ounce in the same price list.

Mr. McEwan asked if Mr. Dunlop allowed for the combined acid, or whether he only took the free acid?

Mr. DUNLOP said he made the calculation on the fact, which had been stated that benzoin yielded from 12 to 15 per cent. of benzoic acid. Mr. Holmes had referred to the different qualities of benzoin, and he remembered Mr. Martindale emphasising the same point at the London meeting, when he deprecated having any but the best quality of drugs, *e.g.*, not olive or sesame oil, not two sennas, etc. There should be definiteness to a great extent, and in many points that was what the Pharmacopœia lacked. The British Pharmacopœia recognised "tears" and "agglutinated masses." Squire recognised masses containing impurities which were left after treatment with rectified spirit; but the B.P. made no such reference. It should certainly go into such *petty* details as the odour of a *drug*, though at present it did so to some extent.

The PRESIDENT hoped this paper would lead to the preparation of others of a similar character, which would be equally interesting. In commerce natural products of this kind were always liable to contain a certain amount of impurity, and it was not always easy to say whether they were accidental or not. There might be samples in the market which were of very little value

to the druggist, and yet might be very useful for the production of benzoic acid, just as morphine obtained from Persian opium, even more than from Turkey, though a druggist would not buy the former at any price.

The PRESIDENT proposed a vote of thanks to Mr. Dunlop for his most interesting communication.

The Conference then adjourned for the day.

Wednesday, August 11th.

The PRESIDENT took the chair at 10 a.m., and said Dr. J. C. McWalter, whose paper was read on the previous day (see page 365) in his absence, owing to a slight misconception, was now present, and would like to say a few words on the points raised in the discussion.

Dr. McWALTER, after thanking the President for his courtesy in allowing him to intervene at that stage, and after recapitulating the chief points raised in his paper, said his reasons for objecting to the use of dried and tablet preparations of organic remedies were these:—The active properties of these glands were probably due to the presence in the gland of certain albuminoid substances, or of ferments, and either of these would in all probability be much altered or destroyed by the application of heat. Secondly, any such process involved a certain amount of delay after the death of the animal, during which post-mortem changes would of necessity take place. In his opinion the gland should be treated not merely in the fresh condition, but absolutely warm; if it were then treated with glycerin, the albuminoids and ferments would be dissolved, without any other constituents which might be harmful. It was futile to talk of a desiccated preparation being prepared aseptically, and kept perfectly dry. Such a thing was practically impossible, and probably the evil results which had occasionally followed the administration of these remedies were due to the production of toxalbumins by the moisture of the air acting on the tablets. The glycerin preparation had also the advantage that it could, if desired, be injected subcutaneously.

In the absence of the author Mr. Naylor then read the following paper:—

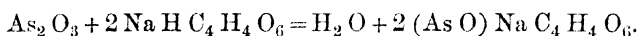
NOTE ON SOME SOLUBLE COMPOUNDS OF ARSENIC.

BY G. G. HENDERSON, D.Sc., M.A.,

Professor of Chemistry in the Technical College, Glasgow.

In the course of an investigation into the reactions which take place between acidic oxides and the alkali salts of hydroxy-acids, I have prepared several compounds similar in type to tartar emetic, but containing arsenic in place of antimony. Some of these substances dissolve in water easily without undergoing decomposition, and may therefore prove of some value in the administration of arsenic medicinally. For this reason I have thought it desirable to bring a description of them under the notice of the Pharmaceutical Conference.

Arsenious oxide dissolves readily in hot aqueous solutions of sodium hydrogen tartrate, with the result that sodium arsenio-tartrate is formed according to the equation:—



The new salt is best prepared as follows:—The calculated quantity¹ of finely-powdered arsenious oxide is added in small portions to a boiling solution of sodium hydrogen tartrate. After all the oxide is dissolved, the solution is boiled for about fifteen minutes longer, and then filtered and concentrated to small bulk on the water-bath. As the solution cools the salt crystallises out as a mass of delicate silky needles, which are collected on a filter, drained by the filter pump, and purified by recrystallisation from water or from dilute (50 per cent.) alcohol. A further crop of crystals can be obtained from the mother liquor by addition of alcohol.

Analysis showed that the formula of sodium arsenio-tartrate is $\text{As O} \cdot \text{Na C}_4\text{H}_4\text{O}_6 \cdot 2\frac{1}{2}\text{H}_2\text{O}$. It crystallises from water in groups of colourless prisms, from 50 per cent. alcohol in colourless plates. If heated to 105° , or if left to stand over sulphuric acid in a vacuum, it loses its water of crystallisation. It is quite stable in the solid state, and may even be heated for several hours to a tem-

¹ 100 grammes arsenious oxide to 192 grammes crystallised sodium hydrogen tartrate.

perature approaching 200° C. without undergoing decomposition. It is easily soluble in water, has a rather sweet but not unpleasant taste, and is of course very poisonous. Its solution has an acid reaction. Seeing that this compound of arsenic is soluble in water without decomposition, it occurred to me that it might find useful application in medicine, and accordingly I handed some to the late Professor Charteris, of Glasgow University, who found that the physiological action of the new salt is practically the same as that of "liquor arsenicalis," for which, in many cases, it should prove an excellent substitute. It will be seen from the formula that 1 gramme of sodium arsenio-tartrate contains arsenic equivalent to 0.3225 gramme of arsenious oxide.

Corresponding ammonium and potassium salts were also prepared in a similar manner, but for practical purposes the sodium salt has several advantages over these. Ammonium arsenio-tartrate is easily prepared, and crystallises in small lustrous needles, which are readily soluble in water, but it is less stable than the sodium salt. When kept for some time the crystals lose their transparency and begin to crumble down, and if then treated with water are found to have decomposed to some extent into arsenious oxide and ammonium hydrogen tartrate. Potassium arsenio-tartrate is obtained, though with greater difficulty than the others, as a white crystalline powder, which, however, is decomposed into arsenious oxide and potassium hydrogen tartrate when treated with water. (For details regarding these and other arsenio-tartrates, see *Journ. Chem. Soc.*, 1895, p. 102.)

Among the compounds which I obtained by the action of antimonious and arsenious oxides on salts of other hydroxy-acids, I may mention the antimonio- and arsenio-citrates. Both of these oxides were found to dissolve in boiling solutions of the primary citrates of sodium, potassium, and ammonium, and on addition of sufficient alcohol to the cooled solutions the new salts were thrown down in the form either of amorphous precipitates or of colourless syrups, which, however, became crystalline when left to stand for some time in contact with the mother liquor. The salts were purified by recrystallisation from hot 50 per cent. alcohol, and were found to have the composition indicated by the formulæ $(\text{SbO})\text{M}_3(\text{C}_6\text{H}_6\text{O}_7)_2$ and $(\text{AsO})\text{M}_3(\text{C}_6\text{H}_6\text{O}_7)_2$, where M stands for Na, K, or (NH_4) respectively. All form colourless crystals, which are easily soluble in water, and fairly soluble in dilute alcohol. The antimonio-citrates are quite stable, but the arsenio-citrates, while apparently stable when in the solid form,

decompose if their aqueous solutions are heated. From a practical point of view they are probably less suitable for medicinal purposes than the corresponding compounds with tartaric acid, *i.e.*, the well-known tartar emetic and the arsenio-tartrate of sodium described above.

The PRESIDENT said they were indebted to Professor Henderson for bringing the matter before them, which was one of deep interest. They were so accustomed to look to the official solutions as the only practicable ones for medicinal use, that any new combination, such as the sodium arsenious tartrate, may be valuable. Its great solubility was an important point. In practice it remained to be proved whether the solution would keep any length of time, and, further, to what extent it might be prescribed with various drugs without decomposition. Those were points which experiment alone could prove, but in the meantime it seemed to be a valuable salt, and one which deserved a trial by medical men.

Mr. UMNEY did not understand whether a definite formula was given for these compounds. If there were efflorescence and a loss of water of crystallisation it might be a very dangerous compound. He did not know whether the author said that the potassium salt was prepared with pure potassium hydrogen tartrate or cream of tartar, and he did not see why a potassium salt should not be formed equally well as the sodium salt.

Mr. NAYLOR said that point was dealt with in the paper.

Mr. STANFORD wished to be allowed to propose a vote of thanks to Professor Henderson, who he was sorry was not present that day. He wished particularly to mention that this paper came from a celebrated laboratory at the old Anderson College, by far the oldest technical college in the kingdom. This College was now merged in the Glasgow Technical College, which consisted of a number of different establishments. It was not generally known to the citizens of Glasgow, and would not be known to the members of that Conference, that they had over 3,000 students in this College, and that they were very indifferently housed, but they hoped in the course of another year or two to have a fine building, in which all the students could be accommodated. He should also like to mention that this was the only laboratory in Glasgow where organic chemistry was taught.

Professor ATTFIELD said a little more attention should be given to this salt, arsenium and sodium oxy-tartrate. The formula

given represented it as containing $2\frac{1}{2}$ molecules of water, which Professor Henderson would probably agree was theoretically impossible, though a useful and short way of showing the constitution. But whenever such half molecules were indicated, even only as a matter of convenience, it generally indicated that the salt was a mixture of two salts, one containing 2 molecules of water, and the other 3. This indication that the salt was unstable, always varying in the proportion of water of crystallisation, rather pointed to unfitness for use in medicine. He thought medical men who desired a definite arsenical solution might pay a little more attention to the ordinary aqueous solution.

The author was then called upon to read the following paper:—

PHARMACEUTICAL ETHICS—A RETROSPECT.

BY LEO ATKINSON, PH.C.

Thirty-one years have passed by since a paper was read by Mr. Joseph Ince before the members of the Conference at Nottingham. This paper is properly regarded as one of the classics of pharmacy. It occurred to the writer that reviving this subject might possibly induce some of our younger *confrères* to give consideration to the practical science of conduct, which there is reason to fear does not occupy a too prominent place in modern, or so-called up-to-date, business methods. At the time Mr. Ince's paper was written, the Pharmaceutical Society was a voluntary institution, and the Pharmaceutical Conference had only existed two years; any one could keep open shop for the sale of drugs and poisons. The evil and danger of permitting medicines and dangerous drugs to be indiscriminately handled by ignorant traders was recognised alike by Parliament and the nation, so that two years later the Pharmaceutical Society was authorised by Government to examine and register all who hereafter should practise pharmacy as a business or profession.

Nothing could conceivably have been more opportune than the consideration of ethics in relation to pharmacy at this juncture. A new era was being inaugurated, and a new class of men bearing the stamp of educational fitness was expected gradually to replace and supersede the general traders who had appropriated the sale of drugs, and called themselves chemists and druggists. The pharmacist of the next generation must inevitably have some

education and professional training; to such a man some code of ethics might be considered a part of his stock-in-trade. Consciously or unconsciously, every one is guided by some principles in all social and business relations. Whether the moral standard be high or low depends mainly on education, intellectual bias, and environment. The great aim which ethics may claim to exercise on society is that each individual may so train his mind that his best actions become instinctive, and that which is mean or base repellent; it was this moral training which gave us a race of pharmacists in the past of whom any society might justly be proud. It is this training which has enabled us to retain men in our ranks at the present day who honourably maintain the high reputation of those who well and truly laid the foundation of British pharmacy.

Every one will agree with Mr. Ince: "the first ethical rule of the pharmacist is the necessity of the absolutely genuine character of his drugs. No drug or remedy should be admitted into his shop other than that which, in case of dangerous illness, he would not hesitate to supply to the inmates of his own family circle."

The second rule is that the pharmacist degrades himself by the adoption of low and ruinous prices. So long as we sell articles sold by other classes of tradesmen we must submit to the same rate of profit. The guiding principle should be increased remuneration in proportion as the character of the articles makes greater demands on professional educational and skill. The abstract soundness of this view can scarcely be questioned, yet the gradual reduction in dispensing charges is the most deplorable factor of these later days; the very foundation of professional pharmacy is being gradually whittled away. The ethical observance that dispensing charges should in no case be calculated on the initial cost of ingredients used is now held by increasing numbers to be unsound and untenable, yet to surrender this principle is to surrender the only title of professionalism pharmacy can claim. Exorbitant prices are in no wise to be defended, yet the man who cuts down his dispensing charges to the scale of pay of a bricklayer's labourer is an enemy to his order.

Advertising in its relation to pharmacy is a delicate subject. The fact is incontrovertible that advertising is the mainspring of commercial activity, and has been the means of building up enormous industries. We may concede at once the impossibility of framing any regulations in regard to the ethics of pharmaceutical advertising. We must, however, regretfully admit the adver-

tisements of medicines and nostrums have an unenviable pre-eminence for qualities not very creditable. Unfortunately pharmacy has to bear the reproach of unscrupulous offenders outside its legitimate rank, the meshes of the Pharmacy Act did not encompass the manufacturer; any one, chimney sweep, costermonger, or a syndicate of quackery can flood the press and the country with lying undertakings to provide perfect health and happy old age for 1s. 1½d. the box or bottle.

The enormous increase in the sale of nostrums is evident from the Revenue returns, in the year 1872 the annual revenue from patent medicine stamps was £82,000, ten years later the amount was just doubled, in 1892 the tax produced £240,000, so that within the last twenty years the income from this source is tripled and the people of Great Britain expend nearly three millions sterling on secret remedies.

The ethical attitude of the pharmacist in regard to advertised nostrums is replete with difficulty, many nostrums we recognise as useful and appropriate for the alleviation of ailments they are recommended for; of other specifics we may be ignorant alike as to composition or effect, but there is a third extensive class our intelligence assures us are hopeless frauds. Experience has taught most of us, the pill or potion will never be fabricated that can impartially cure consumption, cancer, tuberculous bones, kidney, liver, and brain complications, and all children's ailments. The public, we are quite aware, are induced to waste money and health on these wretched swindles. Amongst many anomalies is there anything more absurdly grotesque than a government which frames laws to deal with the length of a skirt, the quantity of glycerin in a hair-wash, the gestures of a clown or the innuendo of a song, yet a government that will not lift a finger to stay the brazen depredations of the quack on the health and lives of the people? We who are behind the scenes understand the subtle methods by which the public are influenced. Suggestive advertisements lead weak-minded people to fancy ailments purely imaginary. This method of imposing on ignorance and credulity has been reduced to a fine art. Surely the ethics of ordinary social life, as well as the ethics of pharmacy, impose an obligation upon us we should not shrink from observing. Though individually we can do but little to stem this torrent or minimise the evil, collectively it is not outside our power to bring this disgrace—clinging to us like the tunic of Nessus—under legislative interference and control.

There is another phase of advertising adversely affecting pure pharmacy; it seems paradoxical that in the domain of medicine the ordinary medical man should be quite as gullible as the general run of humanity. This discovery is presumably a transatlantic importation; our 'cute cousins have immeasurable refinements in gauging and catering for credulous man, be he medical or otherwise.

The modern medical curriculum has unfortunately restricted its requirements in pharmacognosy and materia medica to the narrowest limits; young medical practitioners have scanty opportunity of acquiring any real knowledge of drugs, thus it is they fall easy victims to the advertising manufacturer of ready-made physic. That which alluring advertisement fails to effect is accomplished by methods no self-respecting individual would descend to. The ethical casuistry is incomprehensible which admits of employing some one to undertake work you would be ashamed to do yourself. The old judicial maxim, *Qui facit per alium facit per se*, has lost its force in our trading morality.

Can we wonder the art of writing prescriptions is waning fast, and the national Pharmacopœia less frequently requisitioned than a heterogeneous collection of unofficial complexities? Medical disregard of professional ethics is extinguishing much that was best worth conserving in the joint interest of medicine and pharmacy; that this ethical neglect will bring its own Nemesis and exact a just retribution is not to be doubted. If medical men continue to be so stupidly irrational as to use and supply ready-made physic, the public will soon supply themselves without the intervention of either the doctor or the druggist.

Clearly, as dispensing diminishes, the pharmacist is bound to drift either into the ruck of general trade and sordid competition, or find salvation in catering for the higher requirements of science and scientific medicine. Man cannot live on abstractions. No amount of moral principles will replenish an impoverished exchequer. The downward trend of the bulk of pharmacy in one direction and the aspirations of others sufficiently indicate some unavoidable differentiation in the not distant future. There is no special Providence watching over pharmacy to interfere with the inevitable laws of progress and decline. Excess of folly presages revolution, and circumstances apparently adverse may be hastening our avocation to a higher destiny.

It may not unreasonably be asked, Why discuss ethics if fierce commercial competition has virtually extinguished moral consid-

rations in business affairs? What object can be attained by attempting to press forward when the aim of our desires moves farther off as we advance? History in this matter must be our guide. Above the cloud with its shadow is the star with its light. History has revealed to us that revolutions devour their own offspring. Does not science teach us that the aggravation of a disease not infrequently evolves a remedy? At this day, even with all the sidelights of biography and contemporary literature, it is impossible to determine the origin of the sudden great and salutary change in English manners and habits prevailing in the early years of this century. We can fix a period when the highest in the land esteemed hard drinking and foul language the prerogatives of a gentleman; we can fix a period a few years later when either the one or the other of these attributes would mean ostracism and exclusion from all polite society; this profoundly ethical change was uninfluenced by legislation or pressure of public opinion, it was silently and imperceptibly accomplished by force of examples lost in obscurity, but we rejoice to know this ethical change is binding to the present day.

Is it quite outside the range of reasonable probability that some such change may not sweep over pharmaceutical manners? A retrospective glance may assist our judgment.

Thirty-one years ago the passing of a stringent Pharmacy Act was considered the sole hope of effecting a great deliverance, expressed by Mr. Ince as follows: "Not that any legal measure will at one stroke like the wand of an enchanter transmute the incompetent and nondescript pharmacist into an intelligent and higher being; every Government measure must respect existing rights, and assign a date from which its operations must commence. The first visible effect of passing such an Act will be to flood England with little druggists' shops, and materially to swell the ranks of mediocrity. Time, the great restorer, will set matters right, and in due course we shall have men of superior culture and known ability; then, and not till then, may we truly talk of ethics not as polite observances, but as a code."

Thirty-one years have passed by. For twenty-eight years of this period we have had the Pharmacy Act and compulsory examination Mr. Ince so hopefully regarded. Must we not sorrowfully admit that so far neither by fulness of time nor legislative restriction have those reasonable expectations been realised? We can now see clearly the incursion of mediocrity in the absence of higher educational qualification has been the perpetuation of a

mediocratic class to whom ethical principles and their application vainly appeal. We see also the effect of the great democratic wave which has swept over all civilised communities. Strange would it be indeed if this revolutionary change should have affected in greater or less degree every business or profession to the exclusion of pharmacy. With past experience to guide us, we can see how far pharmaceutical ethics have suffered by the abnormal development of company trading; we discern the effect of an intense interest in trade and a reprehensible craze after cheapness, apparently inspiring every class.

Thirty-one years ago our aristocracy had little connection with trade in its general aspect. At the present day there is no branch of commerce, wholesale, retail, or industrial, our titled aristocracy have not invaded. Yet withal, we have reason to believe pharmacy is once again approaching the threshold of a new epoch; the Pharmaceutical Society, whatever its backslidings may have been, has ever been steadfast in the cause of education; the latest effort is to raise the educational standard; to raise the educational standard of any business or profession must necessarily raise the status of the body corporate. Our hopes are centred in this upheaval; there is no more healthy force than vigorous all-round culture and the accession of men of wider culture will be welcome auxiliaries.

In view of these altering circumstances may we not usefully appeal to those who undertake the business training of young candidates for pharmacy? The apprenticeship stage is the stage when the mind is easily influenced yet permanently moulded, it is the time which, well or ill employed, affects a man's whole after life; habits at first cobwebs, at last become cables. There are a few practical corner stones on which any superstructure may be reared.

Take the inculcation of loyalty to the parent society as an ethical foundation; may part of the instruction be that it is a commercial blunder as well as a breach of pharmaceutical ethics to degrade the pharmacy to the level of a toy shop? Above all, let it be understood that for a man to barter his intelligence and pawn his qualification to any trading adventurers is degrading to himself, degrading to his avocation, and a fraud on Society. There is a common breach of pharmacy ethics which calls for reform—the sale of scheduled poisons to friends or well-known customers without insisting on compliance with the Act. This is a constant trouble; it is not a small matter—it strikes at the very root of

our position as responsible men, and is absolutely inexcusable on any ground or pretence whatsoever. It should not be a great tax on the memory to remember that a straight line is the shortest in morals as well as geometry. Bearing this in mind always in regard to our relations with our fellow-craftsmen, may we ever avoid the temptation to "convey a libel in a frown, or wink a reputation down."

As we expect to recruit our ranks in future from a higher class, it is not unreasonable to expect a higher sense of conduct. Ethical example and precept may yet become a living factor; it is idle to frame theories of moral perfection, which we know can never be more than theories. The observance of some rules of conduct may become customary; custom in those matters become stronger than laws. It is by custom the largest financial transactions are conducted without legal documents. Transactions involving millions daily are thus entered into. A large proportion might be repudiated on technical grounds, yet the positive morality of commerce is found sufficient to enforce them.

There is no association better fitted to foster and encourage practical ethics than the British Pharmaceutical Conference; its very *raison d'être* being mutual advancement and improvement. Individually each may do something towards the consummation of this object. Every man's mission here is to contribute his share to the sum total of labour. If we cannot attain the ideally possible there are many substantial stages of progress. In every great epoch some predominating idea is imperceptibly working, shaping the current of events and determining their ultimate issue. We need not therefore—

"Deem the irrevocable past
As wholly wasted, wholly vain,
If, rising on its wreck at last,
To something nobler we attain."

The PRESIDENT was sure that they had all listened with very much pleasure to Mr. Atkinson's paper. It indicated a large amount of thought, and the principles and arguments laid down were incontrovertible. They had something like 1,400 members of that Conference, and he did not suppose there was one who could not say something on the subject; but he should point out that it would be necessary to curtail the discussion, because they had a great deal of business to get through that day.

Mr. S. R. ATKINS said Mr. Atkinson had remarked that we

could not live on moral principles. He (Mr. Atkins) ventured to think we could not live without them. In Scotland, of all lands on the earth, a philosophical paper of this kind would be welcomed; its metaphysical tone would meet with a warm reception in Scottish intellects. In regard to pharmaceutical ethics, he asked them to look at the matter from the point of view of their own body as pharmacists. A man must work to eat, and he must eat to live. But that was not the end of him. Man does not live by bread alone in any sense whatever. No man had a right to be a mere money-grubber. Their function was to do something for the body corporate to which they belonged. What were the relations they should maintain the one to the other? He ventured to think integrity and generosity; sympathy for the defeated, and congratulation for those who had achieved success in life. That was the function of the British Pharmaceutical Conference. It was formed by, and it had had throughout its career, men distinguished for their high principle. If they went back to the parent Society, represented there most ably by the President of the Pharmaceutical Society—coming as he did from the great historic house in Oxford Street—what was that crusade that Jacob Bell went forth upon, rousing the pharmacists of this country to a sense of the necessity of uniting for pharmaceutical purposes? That was a noble crusade on the part of Jacob Bell. In regard to the medical profession, what should be their relations to it? He thought it should be this. The function of the pharmacist was to make and dispense—he used the word in its widest sense; he meant to manufacture and supply to the public medicines and remedies. Regarding the medical profession, it was theirs to diagnose disease and prescribe for the same. He thought it was for pharmacists to maintain loyally and fairly the function which they had, and not to trench upon other men's matters. If they did that, and brought into play the principles of honesty and integrity in the manufacture of their preparations, he thought they had a right to claim a fair remuneration. In regard to the general public, the same ground was covered. He believed it was very hard lines in these days for some men to bring an elevated ethical consideration into the circumstances of their position. The times were truly hard for our weaker men. He could take them at that moment into a small country town in the West of England, where lived a most cultured man who was starving with £40 a year or a little more. It was hard for such a man to maintain an elevated view of the ethical relations of

pharmacy. And yet he ventured to think their only hope for the future was to observe this ground. They should have to show that they were worthy of the trust reposed in them as educated, honest, intelligent, cultured men. It might be—he did not see how it could well be avoided—that there would be differentiation in regard to their work. It was a cruel business that the grocer who had been fined for selling poisons could at once contract himself out of the Pharmacy Act by making himself into a company. It was illegitimate, if not illegal.

Professor REMINGTON said he regretted to have to speak for his country on the subject of patent medicines, for he considered that possibly they had as much to do with this question of ethics as anything else, because the good old principles that animated all honest men were apprehended, and as well known in this country as they were in his. In connection with this subject, he could not help thinking of a little experience that he had with one of their American newspapers. Some time ago there was an agitation against the use of the Latin language in prescriptions. He did not know whether we had any movement of that kind in Great Britain. It went so far with them that a Bill was introduced into the Legislature of the State of Pennsylvania providing that physicians who should thereafter write a prescription in the Latin language should be subjected to a severe penalty, and, further than that, that the prescription must be written in the English language, understandable by every American citizen. The label must be written by the apothecary in the English language, and the prescription written out in full on the label, so that any American citizen could put up that prescription himself if he wanted to—rather a sweeping and injurious state of things for the drug-business. The question was how to meet this severe proposal. A newspaper took it up, and applauded it in an editorial, and the question arose how pharmacists should meet this movement. He called upon the editor, was received freely, and was told that the Bill was in the pigeon-hole, and that they were going to introduce it in a few days. After talking to the editor for half an hour without effect—for he did not seem to appreciate the fact of there being twelve kinds of snake-root in America, and two kinds of Indian hemp, some harmless, some poisonous—he noticed on the editor's desk the advertisement of a large number of quack remedies and nostrums in his paper, and turning to him, he said, "My dear sir, you demand that every American citizen should know exactly what goes into his stomach

in the way of medicine. Well, look here, there is your newspaper with all these patent medicines advertised in it. What'll become of them if you pass your Bill?" The editor said, "I don't think that has anything to do with it." But he answered the editor thus: "You demand that the physician and the apothecary should place on every bottle the exact constituents of what it contains in the English language. Do you suppose we are going to stand that? What is going to become of your business of advertising if that is done, and the people all over the country will know for themselves what the bottles contain?" That was enough. The Bill was never heard of, and the editor changed his mind. The question of dollars and cents he could understand. He was not going to say anything about the question of common honesty and honour, because he recognised that the standards in this country and the standards in his country were equally good as far as pharmacy was concerned. But he might, in closing, give them one little point about advertising patent medicines which had recently come under his notice. He did not know that in this country they had got quite the latest thing in that. One of the latest points about advertising of these things was, that the advertisement told what the patent medicine was not good for. For instance, at the head of the advertisement was a long list of things that the medicine was good for—consumption, bronchitis, and a score of other things—and down at the bottom you got—"Is not good for corns."

Mr. GADD suggested two ways in which they might all promote pharmaceutical ethics. One was in their educational relationship to one another, and especially to assistants and apprentices. A good deal of attention had been paid to this matter in Exeter, the Pharmaceutical Society having kindly given substantial assistance, and they were paying great attention to organic chemistry, so that any pupil could obtain the best teaching and access to a splendidly-equipped laboratory. The other point to remember was their fraternal relationship, which was too often neglected, and so long as the great majority of registered men were outside the Pharmaceutical Society, it could not be said that they were truly loyal to their brethren. He hoped every local secretary would do all he could to get registered men to join the Society, for, if they would all come in, the President of the Society would be able to approach the Government with a force which would be irresistible, and there would be some possibility of getting an amended Pharmacy Act.

Mr. MACKENZIE thought they were all much indebted to the author of this paper, and suggested that the subject should be brought forward annually and thoroughly discussed, until some practical effect was produced. The question had so many ramifications, that with all the high culture which they could obtain, on which they all agreed, he must say emphatically that unless a man were in a position to carry out his higher aspirations, they would all come to nothing. Still, he never lost faith in the ultimate triumph of right principles. Many years ago an immense deal of good work was done in the direction of preventing the adulteration of food by the publication of a little book called "Death in the Pot," and he thought similar results with regard to medicines might be produced by a similar exposure in the case of some of the quack remedies. If they all united their energies they would soon see the time when the honest pharmacist and the skilful physician would be left alone to administer to the health of the public.

Mr. ANDERSON RUSSELL was delighted with the tone of the paper, and the discussion that had followed. It was pleasing to him that the Conference should take up such a subject, for surely its function was not confined to merely discovering what was best in pharmacy and promoting knowledge with regard to it, but it should also be extended to the application of that knowledge to the purposes for which it was intended. They in their work-a-day lives knew that the influence of trade upon them was almost overwhelming. He hoped that something useful might come from the discussion, and not merely the expression of pious wishes; and he thought the point that they should seek after in their discussions at local associations was to back up the Pharmaceutical Society and its Council in endeavouring to procure additional powers of administration over the general body.

Mr. STANFORD said they heard of a general public which spent three millions a year on secret remedies, and subscribed a million to float Mother Seigel's Syrup, and this was a public that required a great deal of education. It was impossible to over-educate the people, no Board school could do it, not even in Scotland. The original Mr. Holloway said it was not the 5 per cent. of sensible people that he advertised for, it was the other 95 per cent.

The PRESIDENT was sorry that the pressure of business made it necessary to curtail the discussion on this interesting subject, but it was a matter which was worth consideration, whether a whole

day at some future time should not be set aside for the purpose of such discussions. They were just approaching the opening session of all the provincial associations, and he did not see why a paper on the subject should not be read before every association, as well as at Bloomsbury Square, during the coming winter, when the whole matter might be thoroughly sifted.

Mr. ATKINSON briefly returned thanks for the way in which his paper had been received.

The following paper was then read :—

NOTE ON SYRUPUS FERRI, QUININÆ ET STRYCH-
NINÆ PHOSPHATUM (EASTON'S SYRUP).

By R. BRODIE, Ph.C.

The introduction of the phosphate syrups into the official *materia medica* is of comparatively modern date; but since their introduction they have formed a prolific source of communications to the trade journals, to local associations, and to the Pharmaceutical Conference.

In an article on syrup of phosphate of iron and other syrups containing phosphoric acid, contributed by Carteighe to the *Pharmaceutical Journal* in 1871—a lengthy extract from which appears in the *Year-Book* of that year—Mr. Carteighe says: “First introduced to the notice of the profession by Mr. Greenish in a form more or less opaque, it was not until about ten years ago that it came into very general use.

“About this time Gale and Schweitzer each read a paper at one of the evening meetings of the Pharmaceutical Society, detailing processes for the preparation of this syrup in a form which should remain perfectly bright and free from deposit.

“Gale's process was introduced into the British Pharmacopœia of 1867, and since the publication of that volume the demand for this medicine has vastly increased.

“Its tendency to darken in colour after having been kept for some time was soon noticed, and Umney made some experiments with the view of preventing or retarding this change, but the results were not practically satisfactory.”

The syrup of the phosphate of iron is as yet the only one official, but a number of compound syrups have been introduced, and have

come more or less into general use, but the most important, or, at least, the most popular, are Parrish's syrup and Easton's syrup.

The formula for Easton's syrup seems to have been defective to begin with, as it was shown authoritatively and conclusively that a syrup prepared according to it could not possibly contain the active ingredients in the proportions stated, while the methods of preparing the ferrous phosphate and of obtaining the quinine alkaloid made the actual strength of the syrup depend upon the care or carelessness of the operator.

Besides, the syrup, inheriting the weaknesses of its progenitor, soon changed its complexion and became dark in colour, sometimes throwing down a precipitate and at other times becoming a solid mass.

These changes were attributed to various causes, and, of course, in the communications made at different times to the trade journals, etc., suggestions were offered for the improvement of the formula, according to the views of the authors, as to what caused the changes. For instance, excess of acid gets credit for producing disturbance, therefore the quantity is reduced. The amount of sugar is considered to be too great; it also is reduced. The quinine is also considered to be in excess, and it also is reduced at least a fourth; but something is lacking yet, perfection has not been reached; but a long step nearer it was made when the ferrous phosphate came to be prepared by the direct action of the acid upon metallic iron. This insured at least a definite and constant amount of phosphate of iron being present, also the use of phosphate of quinine instead of an indefinite amount of the alkaloid obtained by a very wasteful process insured the presence of a definite quantity of that salt, but the syrup does not yet remain "perfectly bright and free from deposit."

Mr. R. Wright read a note on Easton's syrup at the Conference held at Nottingham in 1893, in which he criticised the original formula, pointing out some of its defects. He also gave a list of some writers on the subject, and mentioned the points to which their attention had been directed, and after summarising their opinions as to the cause of, or the remedy for, the various changes which occurred in the syrup, he concluded his paper by offering a formula for the consideration of the Conference.

Whether it be that the formula then given has proved thoroughly satisfactory or not, I do not know; but nothing further has been said or written on the subject since, as far as I am aware.

I incline to the opinion that the syrup is now made extempore

by means of the concentrated liquor supplied by the wholesale manufacturer.

Now, while this may be the easiest way, it certainly is not the most satisfactory, for I hold that these liquors are not all that they are represented to be.

For the benefit of those who would prefer to make their own syrup, provided they could get a good working formula which would produce a syrup "perfectly bright and free from deposit," I beg to submit the subjoined formula, which I have made use of for a few years with considerable satisfaction.

Take of—

Iron Wire free from Rust	90 grains.
Phosphoric Acid, Sp. Grav. 1.5 (3 oz. avoird.)	2 fl. oz.
Hypophosphorous Acid	1 drachm.
Strychnine (in Crystal)	6 grains.
Hydrochlorate of Quinine	120 grains.
Sugar	16 ounces.
Distilled water, sufficient quantity to produce 24 fluid ounces.	

Put the acids into a flask and dilute with 2 ounces of the water, introduce the iron wire previously cut up into inch lengths, plug the neck of the flask with cotton wool and set aside, allowing the action to proceed without the application of heat. Dissolve the strychnine by means of a very gentle heat in an ounce of water to which has been added an additional drachm of phosphoric acid; after the strychnine is dissolved, add the hydrochlorate of quinine. Filter both solutions into the syrup previously prepared by dissolving the 16 ounces of sugar in 8 ounces of water by means of heat, but care must be taken that the solutions as well as the syrup be thoroughly cooled before being mixed.

As the B.P.C. formula which appears in the *Year-Book* for 1887, and as the formula given by Martindale and by R. Wright, gives 120 grains of phosphate of quinine to 20 ounces of the finished product, it would appear at first sight that my formula contains considerably less quinine, but the difference is very small indeed, and not worth considering if a more permanent preparation be obtained.

However, I may just mention that the actual amount of difference is less than half a grain per ounce of finished product, as you will find by making the calculation for yourselves.

REMARK.—I do not think any serious objection can be urged against the use of hydrochloride of quinine instead of the phosphate, because the quantity of HCl contained in the 120 grains

of hydrochloride amounts only to about 11 grains, and I am led to believe that the most of the phosphate syrups to be found in commerce contain a much larger proportion.

The PRESIDENT said this was a good practical paper. He had always found it best to keep the syrup in small bottles, so as to prevent exposure to the air as much as possible. The principal point in Mr. Brodie's formula was the substitution of hydrochloride of quinine for phosphate, which might be all right from our point of view, but physicians might not think it produced quite the same effect.

Mr. J. C. UMNEY said there was one advantage in the use of anhydrous quinine, or the hydrochloride over the phosphate, which had often been referred to, viz., the existence of more than one phosphate, which had been the cause of a good deal of crystallisation in syrup. Speaking from memory, the difference in the proportion of anhydrous quinine was 3 or 4 per cent. between different phosphates. That difficulty was got over by the use of the hydrochloride, or by the use of anhydrous quinine, which was constant.

The PRESIDENT then proposed a vote of thanks to the author, which was carried unanimously.

In the absence of the author the next paper was read by Mr. Naylor.

HYPOPHOSPHITES.

By CHARLES T. TYRER, F.C.S.

Apart from actual practice, the wording of the descriptions of processes for the qualitative analysis of hypophosphites is not conducive to a belief in their accuracy. The B.P. for testing sodium hypophosphite directs 5 grains to be dissolved in half an ounce of distilled water, and states that the solution, when boiled for ten minutes with 11·5 grains of potassium permanganate and filtered, should afford a nearly colourless solution. Five grains of calcium hypophosphite, if of good quality, will almost decolorise a solution of 12 grains of potassium permanganate on boiling the mixture for about ten minutes. The words "almost," "about," and "nearly" indicate a want of preciseness in the permanganate method.

According to the U.S.P., if 0.1 gm. of dry sodium hypophosphite be dissolved in 10 c.c. of water, mixed with 7.5 c.c. of sulphuric acid and 40 c.c. of decinormal potassium permanganate V.S., and the mixture boiled for fifteen minutes, it should require not more than 3 c.c. of decinormal oxalic acid V.S. to discharge the red colour (corresponding to at least 97.96 per cent. of the pure salt). Even with an absolutely pure salt in excess the permanganate method is not quite satisfactory, the rate and violence of boiling making a difference of .2 to .5 per cent.

Of the above I have found the U.S.P. to give the most accurate results, the great advantage being the addition of acid sulphuric in excess, which keeps the manganese in solution, and does not require filtration. The progress of the reaction can be observed much better. An improvement on this method is to add a slightly greater excess permanganate, say 1 per cent., and titrate the excess with acid oxalic. The permanganate method is of use only in the absence of other impurities, but no hypophosphite is absolutely pure. Quantities of calcium phosphate, sodium phosphite, sulphite, and hyposulphite have been added to the hypophosphites in percentages up to 2 per cent. and more, and apparently answer the B.P. permanganate test, the cause being that phosphite, sulphite, and hyposulphite reduce permanganate. The phosphate reduces it indirectly, that is, as the result of boiling calcium phosphate with calcium hypophosphite produces phosphite with the evolution of hydrogen.

Some authors allow to calcium, sodium, and potassium hypophosphites one molecule of water. This only occurs when the salt is deposited from a saturated solution in the cold. I note that Attfield (p. 400) gives "hypophosphites of sodium, $\text{Na P H}_2 \text{O}_2 \text{H}_2 \text{O}$, sodii hypophosphis B.P.," whereas the B.P. gives "sodii hypophosphis, $\text{Na P H}_2 \text{O}_2$."

In the directions for the calcium hypophosphite test, a "solution" of permanganate is to be used. In directions for sodium hypo test the word solution is left out.

The following experiments were carried out in order to arrive at a satisfactory method of estimation, and to observe the faults of the various reduction processes applicable.

Reactions with mercuric chloride:—

Calcium, sodium, and potassium hypophosphites react in the same way, with excess of the hypophosphite or excess of the mercury salt.

In the cold, partial reduction to subchloride; on boiling, reduc-

tion to mercury; but when hydrochloric acid is present in excess, complete reduction to subchloride in the cold, and on standing in the cold to mercury.

This process is only available with success to the barium hypophosphite, as noted by Mr. Coull (B.P.C., 1895), who estimates as subchloride, and then only if his directions are exactly carried out. I have not found it yield satisfactory results with the other hypophosphites, there being a greater tendency to complete reduction to mercury.

Reactions with copper sulphate:—

Calcium, sodium, and potassium hypophosphites react in the same manner with copper sulphate.

(a) When the copper salt is in excess a mixture of protoxide of copper and copper is formed.

(b) When the hypophosphite is in excess copper results.

These reactions do not take place in the cold, even on standing for several days. More boiling is required to start a reaction when the hypophosphite is in excess, and when once started it is more violent. More boiling is required for the sodium than for the calcium, and for the potassium than for either. In all cases reduction is accelerated by the addition of a small quantity of sulphuric acid.

Reactions with copper chloride:—

With calcium. (a) Copper in excess, no reaction in the cold, reduction to subchloride on boiling.

(b) Hypophosphite in excess, partial reduction to subchloride on standing, reduction to subchloride on boiling.

With sodium hypophosphite. (a) Copper in excess, partial reduction to subchloride in cold, complete reduction to subchloride on boiling.

(b) Hypophosphite in excess, partial reduction to subchloride in cold, complete reduction to copper on boiling.

With potassium hypophosphite. (a) Copper in excess, partial reduction to subchloride in cold, to subchloride on boiling.

(b) Hypophosphite in excess, partial reduction to subchloride in cold, to copper and protoxide on boiling.

With acid. hypophosph., with copper sulphate, whether the copper is in excess or the hypophosphite in excess, reduction to copper.

With copper chloride, whether the copper or the hypophosphite in excess, partial reduction to subchloride on cold, and complete reduction to subchloride on boiling.

In the above, where a mixture of protoxide and copper, or of copper alone, results, hydride of copper is an intermediate product decomposed on boiling.

Estimation of the hypophosphites by reduction of copper sulphate solution has been found to be very accurate. One gramme of the sample is dissolved in distilled water, and barium chloride solution (5 per cent.) added in slight excess (5 c.c. in these experiments) to precipitate any soluble sulphite, sulphate, phosphite, or phosphate present. Allow to stand for fifteen minutes, filter and wash any precipitate; the impurities, if appreciable, can then be weighed or kept for the tests given below. Copper sulphate solution, 10 per cent., is added to the filtrate in excess, with 5 c.c. H_2SO_4 conc. The solution is then boiled in a beaker which will hold double the amount of liquor used to prevent loss by spurling. In ten minutes' boiling the whole of the copper is reduced to metal with a proportion of protoxide present, together with some barium sulphate. This precipitate is now washed by decantation, dissolved in nitric acid, 30 per cent., sodium carbonate added until a slight precipitate is formed, add acid acetic in excess; add potassium iodide solution in excess, and titrate with thiosulphate solution, adding starch liquor towards end of reaction. This is the best method. An alternative method is to neutralise the copper nitrate solution with ammonia, and titrate with volumetric solution of ferrocyanide. The addition of 5 c.c. H_2SO_4 is to enable the reaction to take place more quickly, and to commence at a lower temperature; not so much boiling is required. In this method there is a point of obvious importance to be noted. If acid sulphuric is added in large excess (say 20 c.c. in the above example), only one molecule of copper is precipitated against two molecules if there is only a small percentage of acid present. In the application of this method to the iron salt, this is dissolved in 20 per cent. solution of citrate of potash, and well diluted before reduction.

A method giving good results, but somewhat more troublesome than the above, is to reduce cupric chloride solution 10 per cent. to subchloride by boiling with the hypophosphite solution, wash the precipitate by decantation, dissolving in dilute hydrochloric acid, with the addition of a little nitric acid to oxidise, and boiling to expel excess of nitric acid and titration with volumetric stannous chloride. The critical point can be very exactly noted in this method, but the volumetric solution requires standardisation before using, as it is so liable to change.

QUALITATIVE TESTS.—In all cases the tests of the U.S.P. are more comprehensive and better than those of the B.P.

The barium chloride precipitate in cold solution comprehends all impurities likely to be present.

This precipitate includes phosphate, phosphite, sulphate, and rarely sulphite. An average commercially-pure sample will contain phosphite as its greatest impurity, it being on a manufacturing scale impossible to exclude this. Indeed, the general statement given in text-books gives no idea of the numerous bye reactions which occur on a large scale, owing to the influence of mass action, in several of which phosphite may be formed, and which render manufacturer's difficulties very great.

It has been stated that sulphites are reduced from sulphate present. I have made experiments with all the hypophosphites and acid. hypophosph. on insoluble and soluble sulphates, preserving the mixtures for weeks, boiling for several hours, and keeping at a temperature of 120° F. for three weeks, paper soaked in lead acetate solution being suspended just over the solutions, and in no case has reduction taken place (SO_2 , or a sulphite reacts immediately with a hypophosphite to form S and then H_2S). Thus confirming Mr. Naylor's experiments.

I have also taken mixed solutions of soluble and insoluble phosphites and hypophosphorous acid and hypophosphites, have boiled for hours, and stood for weeks, with silver nitrate paper and lead acetate paper suspended over the surface (H_2S discolours silver nitrate paper and lead acetate paper; PH_3 does not discolour lead acetate paper, but only silver nitrate paper), have also suspended Mr. Naylor's cup arrangement at a temperature of 120° F. over various mixtures, and have obtained no reduction to PH_3 .

To differentiate between the barium chloride precipitates I use the following methods:—

(1) To a portion of solution of a hypophosphite is added magnesia test solution, phosphate is precipitated.

(2) Add barium chloride, acidulated with HCl , then boil for two minutes, add dilute acid nitric and boil; residue will be sulphate.

(3) Add barium chloride to the neutral solution of the hypophosphite, collect the precipitate and wash, scrape the precipitate off the filter paper and place in a test-tube with 5 c.c. water, add some pure zinc gran., then hydrochloric acid and boil, suspending some lead acetate paper in the mouth of the tube. Any discolora-

tion will indicate presence of sulphite; '01 can be indicated thus.

(4) Take another portion of the above precipitate with 5 c.c. water, heat to boiling, and add 3 c.c. hydrochloric acid, continue well boiling for one minute, when all SO_2 will be driven off if sulphite present without having time to act on the phosphite. Then add granulated zinc, phosphite will be indicated by action of PH_3 on silver nitrate paper. (A piece of lead acetate paper should be also suspended over in case H_2S is present.)

In experimenting for the above tests I found that both acid. hypophosph. and acid. phosphorous were reduced to PH_3 by zinc and HCl , so that it is very essential that the above precipitate should be well washed.

In examining samples of recent date and of some years old, in no case did I find sulphite present. In the above experiments various percentages of sodium sulphite were added. The only way in which sulphite could be present would be if gases from coke furnaces accidentally found their exit in a room in which the hypophosphite was prepared. To test this I placed a plate containing moist sodium hypophosphite near an open coke furnace for two hours, a trace of sulphite was distinctly present.

The cause of the presence of H_2S in acid. hypophosph. and hypophosphite syrups has been the subject of much discussion. Having failed by any means to reduce a sulphate by hypophosphite or acid. hypophosph., I looked for it as due to some other cause either in the process of manufacture or in its treatment in making syrups. Finding that zinc and sulphuric acid when added to acid. hypophosph. evolved PH_3 and H_2S , I sought for an analogous reaction. Iron was found to act in like manner. Charcoal, however, was the only likely source, being used in filtration. Acid. hypophosph. has a slight trace of sulphuric acid in order to free it entirely from barium. I found that if such acid. hypophosph. was boiled with animal charcoal H_2S was evolved. Here, I think, is a possible cause of the trouble. Usually charcoal has been used for filtration, as it gets rid of any colour, and frees from suspended barium sulphate, and the acid has been filtered hot through charcoal, the acid. sulph. is decomposed by the charcoal, forming SO_2 , which is acted on by the acid. hypophosph., forming H_2S . The action also takes place in the cold on long standing.

There is, however, a slight distinctive odour generated in pure sodium and potassium hypophosphites which is neither PH_3 or

H_2S . I have noted this odour in some experiments in the hydrogen compounds of phosphorus, and am inclined to attribute it to spontaneous decomposition of the hypophosphite resulting in gaseous P_2H_4 .

QUALITATIVE TESTS.—Calcium. The solubility is 7.2 at 15°C ., and commercial samples are not completely and clearly soluble under this.

The B.P. ignition test gives an incorrect impression. Hydrogen as well as PH_3 are evolved. A slight latitude should certainly be allowed in the presence of precipitates by barium chloride, say .2 to .3 per cent.

SODIUM AND POTASSIUM HYPOPHOSPHITES.—The U.S.P. tests for the detection of potassium in sodium should be included in the B.P. Some latitude with regard to barium chloride precipitants should be allowed as in the calcium salt. The nature of the article and the conditions of manufacture on a large scale render complete absence of phosphate and phosphite impossible. Indeed, the U.S.P. gives a latitude of 2.04 per cent. in the sodium salt, and 1.3 per cent. in the potassium salt. More phosphite will usually be found in the sodium salt than in the others.

A trace of carbonate is always, and should be always, present for two reasons. First, to insure the complete absence of calcium, the latter being more soluble than is generally supposed; and secondly, to prevent generation of the odour above mentioned on keeping. This has been found a very effective preventative to this decomposition. Under these circumstances, if the salts are kept hermetically sealed and free from any contact with moisture, atmospheric or otherwise, no gaseous reduction products result.

BARIUM HYPOPHOSPHITE.—This salt, if completely soluble and neutral, would generally be found pure. It should be neutral. If alkaline, barium hydrate may be present, and will deposit on boiling; if acid, acid phosphate of barium may be present, or the excess may be due to acid. hypophosph., in which case it is particularly liable to gaseous reduction products on keeping.

One point of particular importance is the testing for nitrates, which can be carried out by the usual iron sulphate test. The presence of nitrates may be due to use in its manufacture of imperfectly prepared barium hydrate, which is usually made from the nitrate of barium. Mixtures of barium nitrate and barium hypophosphite are particularly explosive.

IRON HYPOPHOSPHITE.—The extended use of this article warrants its inclusion in the B.P. That according to the U.S.P. tests

should be insisted upon. This is the ferric hypophosphite. The commercial article is unsatisfactory. It is often chosen on account of whiteness regardless of chemical composition. It is generally a mixture of ferrous and ferric hypophosphite. Further, the whiteness cannot satisfactorily be retained and lime be absent unless sulphate is present. It is not very soluble in acid. hypophosph. and pot. cit. neutral solution. The ferric salt, however, can be made perfectly soluble in these solvents. Latitudo should be allowed in the presence of chlorides, as from its manufacture and peculiar property when freshly precipitated, forming a solid mass, it cannot be quite free. Complete solubility, and its freedom from excess of chloride, sulphates, and phosphates, are the chief points in testing. It is not, as U.S.P. states, quite stable in the air, being slightly deliquescent, and when damp liable to formation of phosphate when in contact with the air, and somewhat sensitive to the action of light, like most of the metallic hypophosphites.

ACID. HYPOPHOSPH.—This article is used as a reducing agent in analysis as well as in pharmacy. It should be of a special purity as regards the presence of dissolved salts. Barium hypophosphite is a possible impurity. The slight solubility of barium hypophosphite in acid. hypophosph. renders the presence of a trace of sulphuric acid desirable. There should not be more than a slight residue left upon evaporation and ignition on a porcelain crucible dish. The presence of excessive quantities of silica due to evaporation in bad porcelain is indicated by diluting acid with nine times its volume of water, and standing for twenty-four hours, when any appreciable quantity of silica will separate out. Nitrate should be tested for as in the barium hypophosphite. The acid should not darken with H_2S , and it should be free from odour and colourless. The specific gravity should be 1.137, corresponding to 30 per cent. of the acid.

Arsenic should be tested for in all hypophosphites, being a possible impurity in badly refined phosphorus.

These experiments were made in the laboratory of Messrs. Thomas Tyrer & Co., of Stratford.

The PRESIDENT said this paper indicated a large amount of thoughtful and careful work on the part of Mr. Charles T. Tyrer.

Professor ATTFIELD said his view was that this paper supplied to pharmacists exactly what was wanted in the way of knowledge

respecting hypophosphites. He had had the paucity of that knowledge very forcibly brought before him within the past twelve months, and all who had had anything to do with the making of pharmacopœias would agree that their knowledge generally respecting hypophosphites was extremely limited. The writer's research would go very far towards supplying, at all events, the knowledge that was wanted in pharmacy. He regarded the paper as a model pharmaceutical research—that was to say, a research in the applications of chemistry to pharmacy.

Professor REMINGTON said he realised that this was just the kind of paper that a pharmacist wanted. Properly directed criticism was never objected to by pharmacopœia committees.

Mr. BIRD said some time ago he was very much interested in these salts, and, like Dr. Attfield, was struck with the paucity of the information available. After all, it was only natural that it should be so, because it was only a manufacturer who had the opportunity of viewing these operations on a large scale, and pointing out the means by which the impurities could be avoided. He understood that the reactions which occurred on a large scale were by no means so simple as those represented in the text-books. He was rather surprised that Mr. Tyrer found no sulphite in commercial hypophosphites, which was rather contrary to his own experience. The author had given a very ingenious explanation of the causes of the development of sulphuretted odours in hypophosphite syrup. With regard to the use of animal charcoal as a filtering medium, he thought it was rarely, if ever, used, and he (Mr. Bird) was afraid that it would have a tendency to remove a portion of the alkaloid. He had advocated a method of removing the impurities, which consisted in the precipitation of them by a solution of barium hypophosphite. If a solution of sodium or calcium hypophosphite were taken, and a solution of barium hypophosphite added to it very carefully, a point would be found at which the filtrate, after boiling with nitric acid, would give no precipitate with sulphuric acid or barium salt. It was a curious thing that in a cold solution a barium salt would produce a further precipitate, and by that method it did not appear possible to remove the whole of the impurities, although the most objectionable of them could be so removed. In some samples of sodium hypophosphite he had found the barium precipitate to amount to nearly 10 per cent. of the weight of the original salt. Mr. Tyrer mentioned the presence of carbonate in sodium hypophosphites; it was interesting to know the reason of

its presence, but surely the large quantities which were found in the commercial salt were not necessary. Many samples of sodium hypophosphites were extremely alkaline. Mr. Tyrer did not mention the lead acetate test of the Pharmacopœia, and he presumed his intention was that the barium chloride test should be substituted for it. As a matter of fact, no samples of hypophosphites with which he had ever met had been able to stand the lead acetate test. Some time ago he obtained some re-crystallised hypophosphites, and in the case of the calcium he got a slight precipitate, and in the case of the sodium salt a very copious precipitate.

Mr. J. C. UMNEY said he noticed that Mr. Tyrer now put the solubility of hypophosphite of calcium as 1 in 7.2; the B.P., 1855, put it as 1 in 6, and he had repeatedly had to call the attention of manufacturers to the fact that the solubility did not come up to the requirements of the Pharmacopœia. After this paper, he hoped they might have an authoritative statement on the subject. Mr. Tyrer also referred to the presence of the nitrate in barium hypophosphite, which had been the subject of some controversy between Mr. Tyrer and himself. He used the barium hypophosphite for preparing the strong solution of iron hypophosphite according to the B.P.C. formulary, and observed the presence of the nitrate on the addition of ferrous sulphate, which was a very delicate indicator. He found that every syrup made from barium hypophosphite with nitrate in it went absolutely brown. Mr. Tyrer's explanation was that the barium hydrate from which the hypophosphite was made contained nitrate, and it being thus explained, he presumed that in the future the difficulty would not recur.

Mr. NAYLOR hoped Mr. Chas. Tyrer would give some further attention to this question of malodour, for he did not think pharmacists would accept his explanation as being complete. He did not question it so far as it went, but one could adduce instances of making *syrupus hypophos. co.* in which no charcoal had been used, and yet an unpleasant smell had developed. He was surprised to hear that, in testing so many samples, Mr. Tyrer had not been able to find a trace of sulphite.

Mr. MAREN said he used to be troubled a great deal by the development of a sulphur odour in making the syrup, but he satisfied himself some time since that it was due to the sugar employed. Quite 99 per cent. of refined sugar was faced with ultramarine, which was the cause of the trouble. It was very

important in the case of all syrups to use absolutely pure cane sugar.

Mr. NAYLOR said that by using pure glycerine an unpleasant smell might develop.

Mr. BIRD asked if, supposing a pure solution of the hypophosphites could be prepared, it would be possible to evaporate that, and produce the salt in a dry state and perfectly pure. He thought very few manufacturers would come forward and give as much information as Mr. Tyrer had done.

Mr. MACEWAN remarked that Mr. Maben perhaps did not expect them to take that statement seriously. Tons of sugar were made every day which was absolutely free from facing; and the fact had to be noted that these pure sugars did not in thin syrups give the odour when sulphuric acid was added, but that they did when hypophosphorous acid was used.

Mr. NESBIT said he came to the conclusion some years ago that it was the sugar which was in fault, pure sugar giving a pure syrup, and impure sugar the H_2S reaction. When oxidised by the addition of a little permanganate of potash, it gave no reaction, the sulphites being converted into sulphates. He was convinced that the trouble arose from the sulphites present in the sugar. No doubt they were also present sometimes in the other chemicals.

The PRESIDENT, in moving a vote of thanks to Mr. Tyrer, said his own experience coincided to some extent with that of Mr. Maben. There was a certain peculiar odour, not purely sulphurous, which was sometimes noticed, but which was never found when sugar free from blue facings was used. Pure sugar, free from blue, could now be readily obtained, one firm in Liverpool making such sugar a special feature of their business.

Mr. T. TYRER thanked the meeting for the criticisms on his son's paper. It was due to his son to say that he (Mr. Charles T. Tyrer) was entirely responsible for all the statements contained in the paper. He appreciated, and had anticipated, almost all the criticisms that had been made, but he was sure in his own mind he had exercised a wise discretion in not editing the facts that his son had thought fit to publish. When he and his son took up, in the last few years, the manufacture of hypophosphites, they went into it with total ignorance on the subject, having simply the textbooks to go by, which helped them very little. Their business was to obtain as nearly an approach to a practically commercially pure article as could be found, and he agreed with the statement

that the U.S.P. was the nearest approach to complete literature on the subject. It was gratifying to hear that his son's efforts to do something in the direction of pharmaceutical ethics, in the way of making a good article for the least possible money, had been appreciated. Mr. Umney had referred to a matter which was directly the cause of greater care being taken. In the manufacture of hypophosphites one never knew where the trouble was coming from, the hydrate of barytæ ninety-nine times out of a hundred would pass the test. Mr. Umney wrote to his firm in the course of business pointing out a certain defect, which they denied, of course in good faith; but Mr. Umney was good enough to give details, as all should do when making complaints. His son immediately took notice of the matter, and was careful that that source of error should be eliminated. As to the sulphites he was bound to say that he had not found them. He knew that this point was a matter of difference, and he had therefore made it his business to check some of the results and the statements that had been made. He did not like criticising foreign manufactures, but was sure there were some of unassailable purity. The Conference must take the paper with all its defects as the work of his son; he was pleased that they appreciated what he had done, and he was sure that he would be encouraged to do his best to place all the information that he could legitimately at their disposal.

The next paper read was entitled :--

MEDICINAL PETROLEUM.

By F. C. J. BIRD.

Petroleum in the form of *paraffinum liquidum* and *paraffinum molle* has lately acquired considerable prominence as a medicinal agent, and the object of the present note is to direct attention to an impurity, of frequent occurrence in commercial samples, which interferes with the keeping properties of those combinations in which petroleum is usually administered.

When certain samples of petroleum oil are emulsified—a pure hypophosphite being one of the accompanying ingredients—the emulsion is found to develop, after a time, a strong sulphuretted odour. This naturally suggests the presence of sulphur in some form, and in order to ascertain to what extent this impurity occurs in the petroleum products of commerce, an examination was made of a number of samples obtained from various sources.

The principal tests available for the detection of sulphur are the following :—

(1) *The Combustion test.*—From 1 to 2 fl. ozs. of oil are burned in an apparatus similar to that used in the estimation of sulphur in coal-gas. A lamp is substituted for the Bunsen burner, and to ensure perfect combustion, the end of the trumpet-tube should be closed by an asbestos disc pierced with a circular hole to admit the flame of the lamp. Lumps of carbonate of ammonium having been placed on the disc, the lamp is allowed to burn for seven or eight hours, the condensed products of combustion (including washings of the “tower”) heated with excess of nitric acid, and the sulphur precipitated as sulphate with barium nitrate. Several samples were burned in this manner, results being obtained in each instance agreeing with those given by the reduction test mentioned later on.

(2) The sample of oil is boiled for some time in a flask under an inverted condenser, with a fragment of metallic sodium. After cooling, water is added drop by drop until the sodium is dissolved; more water is then added and the liquids separated. If the petroleum contains sulphur, sodium nitro-prusside solution strikes a fine violet-blue colour. This test is only effective with sulphur compounds which form sodium sulphide with metallic sodium.

(3) On boiling with nitric acid, sulphur compounds are oxidised more or less completely, and may be precipitated as barium sulphate. This, however, is not a convenient method, for to ensure complete oxidation it is necessary to heat the oil for some time in a sealed tube with a large excess of nitric acid.

(4) Oils containing sulphur compounds give a brown coloration when boiled for a few minutes with alcohol, to which a few drops of ammonia and a little nitrate of silver solution have been added. This test has not proved satisfactory in my hands, being somewhat erratic and wanting in delicacy.

(5) No change in colour is produced by sulphur-free oil when boiled with a solution of litharge in caustic soda. The test solution is made as follows :—Caustic soda, $1\frac{1}{2}$ dr.; distilled water to 10 fl. drs. Heat to boiling-point, and whilst boiling add litharge to saturation. Decant the clear liquid. It is by no means an easy matter to boil this solution with oil, for the mixture is liable to such excessive bumping that the contents are almost certain to be projected bodily from the test-tube with explosive violence. Moreover, this test, although giving a black to brown colour with much sulphur, is insensitive to fairly pure oils. I have been able

to devise an improved test which is very sensitive, acts in the cold, and gives results agreeing closely with the indications of the reduction test. Place in a test-tube 1 fl. dr. of the white mineral oil to be examined, add $\frac{1}{2}$ dr. absolute alcohol, and shake well; then add 2 drops of the litharge solution, and shake again for a few seconds. The mixture quickly assumes a deep orange tint with very impure oils, and according to the amount of impurity present passes through all the gradations of orange and yellow up to white with pure oils. The full depth of colour is attained in about a quarter of an hour. At present this test does not answer satisfactorily, either with yellow oil or yellow petroleum jelly.

(6) The reduction test with Zn and HCl is convenient, easily applied, and delicate. It only differs from the official test for sulphurous acid in the substitution of alcoholic HCl for the aqueous solution, the former being more satisfactory in every way. Reduction does not readily take place in dilute aqueous solution whilst if stronger acid be used the action becomes violent and unmanageable. Petroleum oil or jelly 1 dr., absolute alcohol $\frac{1}{2}$ dr., are shaken in a test-tube, and 15 minims pure HCl added, with a fragment of pure zinc. A strip of paper wetted with subacetate of lead is suspended in the upper part of the tube, spurt-ing being prevented by a plug of cotton-wool. The presence of sulphur compounds is indicated by the paper turning brown or black. The hydrogen evolved in contact with pure oils has a pleasant ethereal odour, which the presence of a slight trace of sulphur modifies in a marked degree.

From the examination of a large number of samples the following conclusions are arrived at:—

White petroleum oil having a sp. gr. of about 0.885 can be obtained more free from taste and odour than lighter oils, but it is evident from the following table that the bulk of the white oil found in commerce, much of which is sold as chemically pure, contains a greater or less proportion of sulphur compounds.

White petroleum jelly is frequently a mixture of cerasine and white oil, and partakes of the impurities of the latter. Very pale jellies which are true non-crystalline petroleum residues, generally contain sulphur, probably due to an analogous process of bleaching.

Yellow oils, although generally free from sulphur, are in many cases so tainted with a "paraffine" flavour as to be unfit for internal use.

The yellow petroleum jellies, as far as sulphur is concerned, are

the purest, samples being now met with which are fairly pale in colour, contain no sulphur, and are both tasteless and odourless.

In the preparation of white petroleum oil, solar oil (which is a distillate having a sp. gr. of about .870) is stated to be redistilled, and after rejecting the strong-smelling lighter fractions, the remainder of the distillate is thoroughly dried and agitated successively with sulphuric acid and fuming sulphuric acid. This causes evolution of sulphurous acid and rise of temperature. The acid is separated, the last traces removed, with some of the products of its action, by washing with caustic soda followed by water, and purification completed by filtration through animal charcoal, or sometimes by redistillation. I have endeavoured to ascertain by inquiries made in various quarters, if this represents the process usually adopted, but my impression is that the details of the methods actually in use have not been made public. Some manufacturers say they do not employ sulphuric acid, yet their oils contain sulphur compounds. Another process of purification depends entirely on the use of animal charcoal. Petroleum is distilled *in vacuo*, and the selected fractions are filtered through granular animal charcoal in steam jacketted filters.

Paraffinum liquidum can be obtained either from Russian or American petroleum. There is every reason to believe that most of the commercial oil is derived from the former, as it lends itself more readily to the ordinary process of purification.

Russian petroleum consists chiefly of naphthenes, whilst the American variety is principally composed of hydrocarbons belonging to the methane series; the products of the two thus differ widely in composition. In the few instances in which the origin of the samples in the table could be traced with certainty, it was found that those derived from Russian oil contained sulphur compounds, whilst those oils originating in American petroleum were free. This suggests the possibility of the sulphur existing, either partially or entirely, in combination with the hydrocarbons as sulphonates. Crude petroleum contains on an average .5 per cent. of sulphur (sulphides of methyl, ethyl, propyl, and other alcohols). But these come over with the lighter fractions, and it is quite certain that the sulphur in white petroleum oil *is introduced during the process of bleaching*.

If an oil gives but a pale brown tint when tested with Zn and alcoholic HCl, an excess of hypophosphorous acid will prevent for a long time the development of any sulphuretted odour. When emulsified with hypophosphites about 3 minims of hypophosphor-

White Petroleum Oils.

No.	Sp. Gr.	Colour.	Odour.	Taste.	Litharge Test.	Reduction Test.
1	·865	Water white	Odourless	Castor oil-like	Very deep orange	Black
2	·880	"	"	Tasteless	Very deep orange	"
3	·885	"	"	"	Pale yellow	Pale brown
4	·885	"	Faint odour	Castor-oil-like	Yellow	Brown
5	·875	"	"	Nutty taste	Orange	Deep brown
6	·885	Faint straw	"	Faint, disagreeable	Very pale yellow	Very pale brown
7	·870	Water white	"	Faint, disagreeable	Orange	Deep brown
8	·865	Faint straw	"	Faint taste	Orange-yellow	Brown
9	·875	"	"	"	Full orange-yellow	Deep brown
10	·885	Water white	Odourless	Tasteless	Full orange-yellow	"
11	·870	"	"	"	Orange-yellow	Brown
12	·885	"	"	"	Very deep orange	Black
13		"	"	Faint, agreeable flavour	Colourless	No coloration

White Petroleum Jelly.

14	White	Odourless	Faint, nauseous taste	Orange	Brown
15	"	"	Tasteless	No coloration	No coloration
16	Very pale yellow	"	"		Pale brown

Yellow Petroleum Oil.

17	·890	Full yellow	Slight petroleum	Marked petroleum	No coloration
18	·885	Pale "	Very faint	Tasteless	"
19	·870	" "	Faint, agreeable	"	"
20	·890	Full "	Faint	Marked petroleum	"

Yellow Petroleum Jelly.

21	Full yellow	Odourless	Tasteless	No coloration
22	Yellow	"	"	"
23	Pale yellow	"	"	"

ous acid to the fluid ounce of oil is sufficient excess to preserve such a mixture for several months, but clearly, decomposition is best avoided by the use of a sulphur-free oil or jelly. Many oils are all that can be desired in point of colour, freedom from taste, odour, and fluorescence, the sulphur compounds alone unfitting them for use in pharmacy, and although most manufacturers maintain that the removal of this impurity presents great practical difficulty, it is to be hoped that the efforts now being made at several works will result in the production of oils really meriting the designation, which they often so unworthily bear, of "chemically pure."

The physical characters of a few typical samples, together with their behaviour towards the litharge and reduction tests, are given in the tables on page 413.

The PRESIDENT complimented Mr. Bird on the thoroughness which he showed in his work.

Professor REMINGTON said the first use of soft petroleum was due to Mr. Houghton, of Philadelphia, who introduced a preparation which he called "Cosmoline," because he thought it would have a world-wide reputation and use. Shortly afterwards the Chesebrough Company, of New York, produced what was known as vaseline. Mr. Houghton, unfortunately, died before his preparation came into universal use, but it made a great fortune for those who succeeded him. In preparing the U.S.P. for 1880, the Committee were anxious to introduce this substance, but the two names he had mentioned were trade marks, and secret processes were used in their production. Fortunately, one of the Committee, Mr. Shepherd, went into the oil district of Pennsylvania on a tour of inquiry, and there met with a man who was willing to go into the matter, with the result that in a short time petrolavin was produced at the rate of 3*l.* a pound, whereas the cosmoline, which was practically the same, sold for 50 cents. the ounce. He was put on the right scent by finding that the manufacturers were buying up the residue which was left in the immense tanks in which the crude petroleum were stored. In the bottom of these tanks, particularly in cold weather, there accumulated a deposit of what was called "B.S. oil," which was a great nuisance to the petroleum makers. Mr. Shepherd found that by running this stuff through animal charcoal in a steam-jacketed percolator without any chemical treatment, he could

produce an article identical with cosmoline or vaseline. It was introduced into the British Pharmacopœia as the result of Mr. Shepherd's experiments, and since then it has been sold by pharmacists very largely in America, and he believed the boast that there was no chemistry in the process employed was well founded, for he did not think at the price at which it was sold it would pay to employ chemicals.

Mr. STANFORD said it was very remarkable to find a perfectly odourless oil which contained sulphur, as it was generally understood that the sulphur compounds which were so difficult to remove were the cause of their characteristic odours. It was quite certain that the same treatment would not do for Russian oil and for American petroleum. The best he ever received, for a certain purpose, was sent him by Mr. Stuart, chemist, to the Broxbourn Oil Company; that was a Russian oil, and was perfectly tasteless and colourless. It was tried for a certain time by medical men as a substitute for cod-liver oil, but it was given up with the conviction that it had no effect whatever, and was not assimilated by the human stomach.

Professor ATTFIELD asked if Mr. Bird could state concisely what he considered were the characters which should be required in the fluid which he called *paraffinum liquidum*, for use in pharmacy? They knew a great deal about the solid and spirituous constituents of crude petroleum and something of the gases, but not much about this liquid. Could Mr. Bird suggest any additions to the characteristics indicated, for instance, in the German Pharmacopœia?

Mr. J. C. UMNEY said the presence of sulphur in these refined white mineral oils was of importance for another reason. These oils were now being used largely in the south of France to replace pomades for *enflourage* purposes, and it was very important that they should contain no sulphur. It was found that after standing liquid perfumes made by extraction with these inferior oils developed curious odours, but by the use of white mineral oils absolutely free from sulphur a good many manufacturers were now preparing concentrated liquids corresponding to the pomades, from which the perfume could be shaken out with spirit, and which kept perfectly well. No part of the petroleum passed into solution, which had been the disadvantage hitherto of making perfumes from the old-fashioned pomades, in which, with a fall of temperature, some of the fats came out of solution and rancidity and other troubles ensued.

Mr. THOMAS TYRER said sulphur compounds seemed to be as malodorous as ever. In connection with the hypophosphite question he had been unfortunately the subject of severe criticism, the cause of which he knew to be the petroleum used in the emulsion. It was therefore very gratifying to him to find an authority like Mr. Bird coming in at the psychological moment to his assistance. He knew a case in which a very large quantity of petroleum emulsion had gone bad and had to be destroyed, and on investigation it was found that the petroleum was of the character Mr. Bird had described; further, there was no reason why an article perfectly free from sulphur compounds should not be produced.

Dr. McWALTER asked if Mr. Bird had not found a decidedly acid reaction by the tests commonly used? He had not found any of the soft paraffins as useful as vaseline for that reason, but even vaseline would get acid if it were kept a long time, and that was the great drawback to its still more extended use for skin affections.

Mr. McEWAN asked if Mr. Bird had looked for any amylin products, to which the fluorescence sometimes noticed had been ascribed, and which might to some extent account for the odour?

The PRESIDENT remarked that the statement by Professor Remington that no chemistry was used in the production of the American preparations probably applied only to the yellow ones, not to the white oils.

Mr. SEYLER asked if Mr. Bird could give any data as to the quantity of sulphur in these oils.

Mr. BIRD said he had been much interested in Professor Remington's reminiscences of the production of vaseline and cosmoline; which reminded one of the early days of the gas industry when the by-products were really of no value, whereas at last they became almost more important than the gas itself. As to the odour of these sulphur compounds, that was the deceptive part of it. They were practically free from taste and smell, and there was no indication to the senses of any sulphur being present. In reply to Dr. Attfield, the only addition he could suggest to the characters mentioned in the German and American Pharmacopœias was the sp. gr. 0.885 to 0.890, and in addition to the other tests, one of the two he had mentioned; the hydrogen was applicable to yellow samples, and had that advantage over the lead. He sympathised with Mr. Tyrer when his hypophosphites got a bad name through the fault of the petroleum emulsion, but did not think

it was the first instance of the kind. He knew of preparations of petroleum which had gone wrong, and as they contained hypophosphites, the malodour had been attributed to them. The manufacturers with whom he had been in communication said there was great difficulty indeed in removing sulphur compound from the white oils, but he noticed that the products of different manufacturers varied very much in the proportion they contained, so that evidently some processes were better than others. As far as he had observed, these oils when agitated with alcohol gave a perfectly neutral solution; he found no free acid whatever. He had not time to make any quantitative experiments, and could not say how much sulphur was present.

A vote of thanks was accorded to Mr. Bird for his very practical paper.

The Conference then adjourned for luncheon.

On resuming, a half-hour's interesting lecture was delivered, entitled:—

THE SALIENT FEATURES OF THE SCOTTISH FLORA.

By G. C. DRUCE, M.A., F.L.S.

The following is an abstract only of a short extempore lecture by Mr. Druce under the above title:—

Our British flora includes altogether about 1,800 species, of which between sixty and seventy are confined to Scotland, some of which are very interesting; but they are not spread all over Scotland, nor are they seen by every tourist, but only by those who go outside the beaten track, and up into the mountains, for the majority of them are essentially mountain plants. Taking the natural orders, there is of the Ranunculaceæ only one species peculiar to Scotland, and that a doubtful one. Of the Cruciferae there are two. Of the Caryophyllaceæ there are six or seven, mostly alpine species. Of the Leguminosæ, four or five, one of which, *Lathyrus niger*, or black pea, is not a mountain flower, nor yet positively made out to be native. In the romantic pass of Killiecrankie it may be found, but it requires searching for. Of the Rosaceæ there are only two or three species peculiar to Scotland, one of which is only found in the Isle of Arran, and it is rather an open question whether *Pyrus scandica* is a distinct species or a hybrid of the mountain ash and the true *Pyrus*. The Umbelliferæ

are not specially represented in Scotland, but of the Compositæ there are four or five species not found in England. Of the Ericaceæ or heath tribe there are four or five which are not found south of the border, and some of these are only found in very limited areas. One, the very beautiful blue heath, *Phyllodoce taxifolia*, is found only on a certain mountain in Inverness-shire, though it is common enough in Norway. Another ericaceous plant, though not at all like the heaths, is one of the wintergreens, *Pyrola uniflora*, which is scattered over four or five localities, extending up to Ross-shire, but is more frequent in the locality adjoining Perth, on Lord Mansfield's estate at Scone, from whence the coronation stone was brought. At one time Dr. Buchanan White, one of the greatest of Scottish botanists, went with him to try and discover this plant there, and after walking about a long time, he thought he had found it. Dr. White thought it was not the real thing, and they sat down and argued it out for some time, until at length, shaded by the tree-trunk on which they were sitting, they saw a plant actually in flower. It was really very abundant in that locality, but was not often noticed because it rarely flowered, being nibbled at so much by the rabbits. In Caithness occurred *Primula sistica*, a charming species. Of special Labiates there are none, but the dwarf beech is not infrequent, and there are four species of willows which do not exist southwards. Of liliaceous plants there is one species, a Solomon's seal, not the one common in Britain, the root of which is, or was, used in medicine, but differing considerably from it, the leaves being in whorls of three, and the plant altogether of different aspect. In the beautiful district round Craighall, and near Blair Athol, this *Polygonatum verticillatum* was found; he was once taken a good many miles when a youth to find a specimen, which proved to be a white foxglove, though he had not the heart to disabuse his guide of his error. *Eriocaulon*, a curious species common on the west coast of Ireland, is found in Skye, but not on the mainland of Europe. There are four or five plants of the rush family not found south of the border, two not being of an alpine character, although one is called so, the *Juncus alpinus* and *Juncus balticus*, the latter being common on the eastern coast. Of the sedges there are eight or nine, two of which are not alpine. *Carex salina* was discovered not long ago at Thurso, and the following year at Beauly, north of Inverness. It is a common plant in Norway, where it is extremely variable, and has had some twenty different names given it by Scandinavian botanists. Another sedge had

recently been found in Argyllshire which was formerly supposed to belong solely to Ireland, and this was only found in one place, and was gradually disappearing. Of grasses there are five or six peculiar to Scotland, one of which, the holygrass, or *Hierochloa borealis*, a beautiful species, had an extremely interesting history. It was said to have been discovered in Glen Cally by George Don, of Forfar; but Hooker, who did not treat Don with much respect, spoke of it as a "reputed discovery," and no one else ever found it at Glen Cally. Recently, however, Robert Dick, of Thurso, had found it by the Thurso river; and he (Mr. Druce) was proud to possess a specimen gathered by Robert Dick himself in that locality. So far he had mentioned only those plants which grew away from the ordinary routes; the others might be found pretty much in four localities. First, the mountains of Ross-shire and Sutherlandshire, where the *Arctostaphylos alpina* is found on the shoulders of the mountains. Somewhat higher, from 1,200 to 3,000 feet, you get a pretty little plant, the *Azalea procumbens*, or *Loiseluria procumbens*. It reaches its maximum of frequency not in Ross-shire, but further south on the Cairngorms. In Ross-shire also there is a lowland plant, one of the Ranunculeae, *Calltha radicans*, belonging to the same group as the marsh marigold of English meadows. The Scotch species differs slightly in the outline of the leaves, and by the habit of rooting at the nodes. This again was discovered by Don near Forfar. He had had the pleasure of finding it in Forfarshire, and also in Ross. It grew only in extremely shady places, and this had possibly caused the modification in its habit. The next locality was further south, viz., Clova, near Kirriemuir (better known as Thrums), a district to be recommended to any one desirous of a rich harvest of Scotch botany, and it also included some very beautiful scenery. There may be found at least ten or twelve species which it would be difficult to discover elsewhere, even in Scotland. Conspicuous amongst them was the *Erigeron alpinus* and *Lactuca alpina*, a beautiful blue composite plant which only grew in very inaccessible places. In England the sow thistle is yellow, but this alpine species is blue; it grows at an elevation of 3,000 to 4,000 feet in a few rocky fissures in Forfarshire and Aberdeenshire. Further north is a distinct area, best visited from Dee-side, and there in the secluded forests of the Duke of Fife and Mr. Farquahar, on the mountain called Craigendall, is found an extremely rich selection of Scottish plants, which can be gathered without danger. *Astragalus alpinus* last June covered acres of ground, and several

rare sedges also abounded. The richest district of all, however, is found in the Breadalbane Mountains. Ben Lawers was one which nearly every botanist climbed, and when he got to the top he was well rewarded. He might be quite sure of seeing *Saxifraga cernua*, which was found in no other part of Great Britain. It very rarely flowered, but is reproduced by little bulbules in the axes of the leaves, and, despite the depredations of botanists, still holds its own. With it is a plant not exclusively Scotch, the blue *Myosotis alpestris*, much deeper in tint than the forget-me-not found by English streams or in the Scotch lowlands, and somewhat different in aspect, having a beauty peculiarly its own. Out of the sixty-five plants peculiar to Scotland, something like thirty may be found on Ben Lawers alone. His object in coming to Scotland this summer was to try to add one more to the flora of that district, because some time ago a friend brought him a sedge he had recently found there, which he thought must be investigated on the spot, and he had reason to believe that it might prove to be *Carex helvola*, a species not known as yet in any precise locality of Great Britain.

The PRESIDENT moved a hearty vote of thanks to Mr. Druce for his communication, which would be valued by all botanists, especially those who were about to visit the localities he had named.

This was followed by a :—

NOTE ON THE STRENGTH OF COMMERCIAL SAMPLES OF ALKALOIDAL TINCTURES.

By CLARENCE A. SEYLER, B.Sc., F.I.C.

Among the subjects of investigation suggested for the present meeting of the British Pharmaceutical Conference was the strength of commercial samples of alkaloidal tinctures, and a number of these having been submitted to me as analyst for the Glamorgan County Council during the past and present year, I thought it would be of interest to collect the results, which I have now the honour to communicate.

The tinctures examined were the following:—*Nux vomica*, *belladonna*, *hyoscyamus*, *aconite*, *cinchona*, and *opium*.

In most cases the amount of extract and the specific gravity was determined as well as the total alkaloids.

With regard to the methods employed, the solids were determined by drying 5 cubic centimetres upon coarsely powdered pumice contained in a flat nickel dish and heated in a current of air in Soxhlet's drying oven at a temperature a few degrees over 100 C. The specific gravity was taken by the pycnometer. The total alkaloids were determined gravimetrically according to the methods employed by Farr and Wright in their admirable series of papers to be found in the *Year-Book of Pharmacy* and elsewhere.

The following scheme indicates the method of procedure :—

(A) 10-100 c.c. tincture evaporated to drive off alcohol,—volume being made up with water. Cool, add 1 c.c. semi-normal acid, and filter through cotton wool into separator. Shake up with 10+5+5 c.c. chloroform till this is colourless. Separate.

(B) *Purified acid tincture.*

Add 2 c.c. liquor ammon. B.P., and shake with 10+5+5 c.c. chloroform till this on evaporation gives no ppt. with Mayer's reagent. Separate.

(C) *Crude coloured chloroform.*

Wash with three portions of acidified water (20 c.c. water and 2 c.c. seminormal acid). Separate.

Add washings to B.

(D) *Washed coloured chloroform.* Reject.

(E) *Crude alkaloid.*

Shake with three portions of acidified water, as in C. Separate.

(F) *Residual tincture.* Reject.

(G) *Alkaloidal salt solution.*

Add 2 c.c. liquor ammoniæ, and shake with 10+5+5 c.c. of chloroform, as in B.

(H) *Chloroform on evaporation must give no ppt. with Mayer's reagent.* Reject.

(K) *Pure alkaloid.*

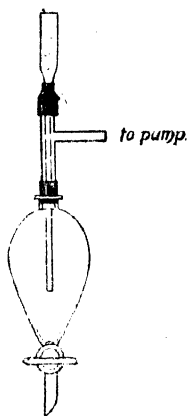
Evaporate, weigh, and titrate.

(I) *Alkaline residue.* Reject.

In the case of nux vomica and of quinine wine, it was found more difficult than was expected to extract the alkaloid so completely that the residual tincture shall yield no trace of alkaloid when shaken with a fresh portion of chloroform. 10+5+5 c.c. only extracted the alkaloid completely when not more than 10 c.c. of tincture of nux vomica were used; with 25 c.c. the treatment had to be often repeated. This is especially the case if violent agitation is avoided with a view to prevent the formation of those obstinate emulsions which render the process so tedious. In this case a further extraction with five portions of 5 c.c. often failed to remove the alkaloid completely, and violent agitation seems to be necessary.

I can strongly recommend the suggestion of Platt, in the *Journal*

of the *American Chemical Society*, for the separation of the resulting emulsion. The emulsion is simply filtered through a layer of about 2-4 centimetres of tightly-packed cotton wool by means of the filter pump. The following apparatus has been found very practical :—



[The above block was kindly lent by the Editor of *The Chemist and Druggist*.]

The filter is made of a piece of combustion tubing drawn out into a long tube about the thickness of a knitting-needle. A tap separator is fitted with a cork through which a glass T tube passes, the horizontal limb of which is connected with the pump, while the filter tube passes through the vertical limb into the separator, connection being made by a piece of rubber tubing. The pump should be fitted with a three-way tap, by means of which, by a single motion, the interior of the separator may be connected with the exhaust or with the outer air. The emulsion is gently sucked through the filter, when it separates into two clear layers, the lower of which is chloroform, and can be cleanly tapped off.

The same apparatus I have found most convenient for filtering in titrations with Mayer's reagent, the cotton wool being replaced by a prop of glass wool and a thin filtering layer of fine asbestos. A few drops can be rapidly filtered through, tapped off and tested. By this means a separation can be effected in a few minutes which would otherwise require several days, and the labour of the process is much lightened. The chloroform was finally distilled off in a small flask dried in the air bath with the aid of the hand bellows and weighed.

Although the principle of titrating the residual alkaloid is a good one, I have not been able to get quite satisfactory results with any of the indicators used. With iodeosin the end reaction was not sharp enough, the colour becoming very faint, but then vanishing slowly. Solution in excess of semi-normal HCl, and titrating back with N/100 baryta and hæmatoxylin, gave on the whole the best results, but they were very erratic, the end reaction being often inexplicably indistinct.

In the case of tincture of opium I employed the method of Teschemacher and Smith modified by Dott. This I prefer to the B.P. process or any modification of it, for the following reasons:— It requires a small quantity, 25 to 50 c.c., of the tincture; it avoids the uncertainty involved in taking aliquot parts of the whole and allowing for the volume of the precipitate as in the lime methods. The precipitated morphine was collected upon the filtering disc of a Hirsch funnel, sucked as dry as possible, and the moisture displaced by a very small quantity of morphiated spirit, and the precipitate then washed on the filter with benzene to remove any narcotine, dissolved in excess of N/20 HCl, and titrated back with baryta water, using hæmatoxylin as indicator. Here again the indicator is the weak point, the end reaction being sometimes very sharp, but at other times unsatisfactory.

The results are shown upon the following table, all being expressed in parts per 100 volumes:—

Nux Vomica.

Solids.	Total Alkaloids.
1.30	0.226
1.21	0.216
1.66	0.202
1.04	0.200
1.07	0.196
1.28	0.192
1.24	0.114

The tincture should contain 0.229 part of alkaloids per 100 volumes. In no case was this amount reached, and in several the amount fell very considerably below. Still even this imperfect method of standardising the tincture is without doubt of great value, the variations being with one exception without much importance.

Tincture of Belladonna.

Alkaloids.	Solids.	Specific Gravity.
0.028	1.38	.9297
0.023	—	.9233
0.019	1.05	.9273
0.014	0.96	.9355
0.014	0.55	.9568

Farr and Wright suggest 0.026 part of alkaloids. These results show a variation of 50 per cent., and in the last case proceedings were taken on account of the deficiency of alcohol. The low alkaloid seems to show that in several cases foreign leaves were used instead of the English ones directed by the British Pharmacopœia. The strength of the alcohol on the average was only about 3° under proof except in the last case, which was over 30° under proof.

Tincture of Hyoscyamus.

Alkaloids.	Solids.	Specific Gravity.
.003	3.92	.9310
.011	2.96	.930
.013	—	—
.014	—	—

Farr and Wright suggest 0.010, so that except in the first case all the samples were above this strength.

Tincture of Aconite.—This should contain about 0.050 part of alkaloids and 2.3 of solids, and have a specific gravity of about 0.8550. On this basis we may classify the samples as follows:—

	Alkaloids.	Solids.	Specific Gravity.	Remarks.
3 over strength .	(0.0628	2.80	0.0544	Spirit weak.
	0.060	1.29	0.8517	
	(0.052	3.05	0.8729	
3 good or fair .	(0.050	2.37	0.8591	Spirit rather weak.
	0.045	2.02	0.8410	
	(0.044	0.70	0.8472	
3 weak	(0.036	1.97	0.8627	Spirit rather weak.
	0.026	3.19	0.8528	
	(0.025	0.63	0.8530	
1 very weak . .	0.012	2.24	0.8605	Spirit rather weak.

In the absence of any reliable method for the estimation of the aconitine separately, the total alkaloids were determined. The solids show remarkable variations, quite uncorrelated with the amount of alkaloids.

Compound Tincture of Cinchona.—This should be made from bark containing between 5 and 6 per cent. of alkaloids, which, if completely extracted, would give 0.5 per cent. for the compound and 1 per cent. for the simple tincture. Making allowance for the imperfect extraction of the B.P. process, I think 0.4 and 0.75 per cent. respectively would be fair quantities to expect. The compound tincture of cinchona is one of the most unsatisfactory preparations I have examined. The following table classifies the results :—

Compound Tinctures.

	Alkaloids.	Solids.	Specific Gravity.	Remarks.
1 over standard . . .	0.73	3.87	0.9436	Spirit rather weak.
2 fair strength . . .	{ 0.42	3.44	0.9495	
	{ 0.37	5.32	0.9445	
	{ 0.348	3.88	0.9384	
5 rather low strength	{ 0.316	5.4	0.9439	
	{ 0.33	3.93	0.9385	
	{ 0.32	4.79	0.9405	
	{ 0.30	3.98	0.9422	
2 very low strength .	{ 0.20	—	0.9178	Spirit weak.
	{ 0.15	2.79	0.9507	

Simple Tinctures.

	Alkaloids.	Solids.	Specific Gravity.	Remarks.
1 low strength . . .	0.586	3.01	0.9404	
2 very low	{ 0.42	3.57	0.9466	
	{ 0.15	2.19	—	

Tincture of Opium.—This is directed to be prepared from standardised opium containing about 10 per cent. of morphine by the B.P. process, and if the alkaloid were completely extracted, would contain 0.75 per cent. part of morphine per 100. In practice, however, only 0.5 to 0.6 is obtained by following the directions of the B.P. Assuming that the process of assay adopted gives results about 0.1 part per 100 volumes more than the B.P. process, these

figures would become—theoretical, 0·85 ; practically obtained, 0·6 to 0·7 per cent.

Of the eleven samples only three fell within these limits :—

Tincture of Opium.

Morphine.	Extract.	Specific Gravity.	Remarks.
0·649	3·18	0·9564	Spirit weak.
0·664	3·55	0·9229	
0·736	3·46	0·9320	

Five samples gave about the theoretical percentage, showing either that stronger opium or that a different method of extraction from that prescribed by the Pharmacopœia was used.

Morphine.	Extract.	Specific Gravity.	Remarks.
0·844	4·2	0·9390	Spirit weak.
0·851	3·87	0·9350	
0·855	4·37	0·9370	
0·872	3·82	0·9600	
0·872	4·54	0·9414	

Three samples were considerably over the maximum possible strength which could be obtained by using standardised opium :—

Morphine.	Extract.	Specific Gravity.	Remarks.
0·906	4·84	0·9420	Spirit rather weak.
0·933	4·26	0·9470	
1·120	5·3	0·9424	

This is the only tincture examined in which anything like approximate correspondence between the amount of solids and alkaloid was observable, and here only to the extent that those with the most alkaloid contain generally a larger amount of extract.

The PRESIDENT, in moving a vote of thanks to Mr. Seyler, said they were indebted to him for the large amount of work he had done. This paper was one which would subsequently be read with interest, because the figures could be followed more closely than from the abstract which had been read.

In the absence of the author, Mr. F. Ransom read the next paper:—

PHOSPHATES AND PLATINUM.

By W. G. STRATTON.

The author, some time ago, while igniting a mixture of ammonium phosphate and Rochelle salts on platinum wire before the blow-pipe, was surprised to see the platinum fuse and become quite friable. Shortly afterwards he mentioned the occurrence to a scientific friend, who informed him that he had had a somewhat similar experience, having heated charcoal, which contained a phosphate as an impurity, in a platinum crucible, with disastrous results to the precious metal.

As this action seems little known, it was thought advisable to draw attention to the matter.

Granger (*Compt. Rend.*, 1896, 123, 1284-5) has shown that when platinum is heated in phosphorus vapour, in a current of carbonic anhydride, at a high temperature, action takes place, the product being a phosphide of platinum. The physical appearance of this body, as there described, closely accords with that of the author's experiment.

Assuming that the phosphate was reduced by the carbon of the tartrate with the liberation of phosphorus, all the conditions for the production of platinum phosphide would be present.

The author regrets that owing to the lack of time he has been unable to follow the subject further, and contributes this short note in the hope that it may be the means of saving expensive apparatus from unwitting destruction.

The PRESIDENT, in thanking the author, said this was one of those short notes that were always very interesting. It was a known fact that phosphates and platinum could be fused readily, but bringing it before the Conference and placing it on record in this way perhaps directed more attention to it than a lecturer's reminder on the subject would do.

The following note, in the absence of the author, was read by Mr. F. Ransom :—

LIQUOR BISMUTHI ET AMMONII CITRATIS.

By W. G. STRATTON.

This research was undertaken, at the suggestion of the editor of the *Chemist and Druggist*, in order to determine whether a variation in the composition of commercial liq. bismuthi was the cause of the varying results said to have been sometimes obtained when that preparation was dispensed with an alkaline bicarbonate.

Eleven samples were examined. Nos. 1 to 7 were those mentioned in a communication to the *Chemist and Druggist* (vol. 1., page 597). The pharmacist who supplied No. 3 having stated its source, application was made to the manufacturers, and from them No. 8 was obtained. Nos. 9 and 10 were obtained from a Midland pharmacist. No. 11 is liq. bismuthi Schacht.

The specific gravities were taken with a Sprengel's tube.

The bismuth was determined as follows :—A known volume of the liquor was acidulated with acetic acid, and the bismuth precipitated with sulphuretted hydrogen. The bismuthic sulphide thus formed was caught on a filter, washed, and digested in a solution of sodium sulphite. It was then collected on counterpoised filter papers, again washed, and dried in a water-oven at 98° C., weighings being made at intervals until the weight began to increase.

The ammonia was determined by adding excess of sodium hydrate to a known volume of the liquor contained in a distilling flask and distilling into a known volume of a standard solution of sulphuric acid. The excess of acid was titrated with standard solution of caustic potash and the quantity neutralised by the ammonia thus obtained.

The citric radical was determined as follows :—The bismuth was precipitated from a known volume of the liquor as sulphide by passing a current of sulphuretted hydrogen. The precipitate was filtered off and well washed, the washings being collected and added to the filtrate. The latter was boiled until free from sulphuretted hydrogen. Excess of standard solution of sodium hydrate was then added, and the liquid again boiled until free from ammonia. The excess of sodium hydrate was next determined, and being deducted from the quantity originally added,

the amount which had combined with the citric radical was obtained.

From the data afforded by these processes the percentages of bismuth, ammonia and the citric radical were respectively calculated.

None of the samples were neutral to litmus, but the divergence from neutrality in each case was extremely small. Alcohol was noticed to be present in several instances.

The nitric radical occurred in six samples, the quantity present in Nos. 3, 8, and 10 being fairly large.

The following table gives the results obtained, the theoretical quantities of bismuth and the citric radical being placed at the head of their respective columns. In all cases the figures are the mean of two or more experiments:—

No.	Sp. Gr.	Per cent. Bi.	Per cent. NH ₃ .	Per cent. C ₆ H ₅ O ₇ .	Impurities.
Theoretical	1.07	4.375		3.956	
1.	1.070	4.377	1.048	3.910	Nitrates
2.	1.063	4.167	.927	3.427	
3.	1.135	4.476	3.535	14.209*	Nitrates
4.	1.070	4.748	.746	3.647	
5.	1.073	4.585	.807	4.109	
6.	1.073	4.548	.871	3.817	
7.	1.072	4.285	.991	4.232	Nitrates
8.	1.150	5.552	3.777	14.736*	„
9.	1.070	2.968	2.034	6.182	„
10.	1.122	5.164	3.200	11.426*	„
11.	1.029	1.944	.686	2.663	

It will be seen from these figures that some makers improve on the B.P. preparation by adding an excess of citrate of ammonium. The influence of this salt in preventing the precipitation of bismuth carbonate being so well known, it seems almost unnecessary to say that samples Nos. 3, 8, 9, 10, and 11 would, if dispensed in combination with a bicarbonate, yield mixtures of very different appearance to those in the preparation of which the other samples were used.

My thanks are due to Mr. E. H. Farr, F.C.S., Uckfield, in whose laboratory my experiments were carried out.

* Owing to the presence of considerable traces of nitrates in these samples, the figures for the citric radical represent a somewhat larger amount than was actually present.

The PRESIDENT, again thanking the author, said this was a very practical paper, and would be useful to them all in their everyday experience. The author's remarks would be of value in dealing with the preparation, especially as he had made a study of it, and had had the assistance of so eminent a pharmacist as Mr. Farr.

In the absence of the author Mr. Naylor then read the following paper :—

DISINFECTANT SOAPS.

By S. RIDEAL, D.Sc. LOND., F.I.C., F.C.S.

Notwithstanding the recent increase of our knowledge of disinfectants, little attention seems to have been paid by soap manufacturers to this subject, so that even at the present time, soaps which were introduced many years ago still find favour with the public, although their efficacy as germicides is very small. This has arisen partly from the fact that it is seldom that disinfectant soaps are properly tested as to their germicidal action upon specific organisms under conditions which approximate to their use in practice; and partly owing to the fact that there are many disinfectants which have valuable properties, as such, but which are totally unfitted for use in conjunction with soaps.

The conditions which obtain when a disinfectant soap is used are very different from those of ordinary disinfecting. As a rule the time of contact is much shorter, and the volume of water or vehicle much less. As the time of contact is short, so it is necessary that the percentage of active ingredient should be high. As the volume of water used per unit weight of disinfectant soap is usually much less than is recommended when a liquid disinfectant is employed, this usually assures a higher percentage strength of the active ingredient if it is present in the soap in anything like reasonable proportions. On the other hand, it is important to note that unless the disinfectant employed is readily soluble in water, actual contact of the infected parts with the disinfectant cannot be attained in the limited time given to washing. In coal-tar soaps and those containing oils which are not very soluble in water, although the disinfectant is emulsified by the soap, the actual laving of every part of the infected area by the active ingredient for the necessary

time to effect the death of the micro-organism is by no means certain. Organisms differ very markedly in their resistant power; many of them form spores which are especially difficult to kill, so that even when a soap contains an approved disinfectant the latter must be present in quantity above that required for the fatal dose for the most resisting spores.

Although at the present time there is no legislation on this matter, medical men and the public are becoming alive to the importance of thorough disinfection in all cases of infectious disease, and those soaps which can be relied upon as containing definite amounts of active disinfectants are already making headway against others which are of more uncertain composition. It is, therefore, of extreme importance to the soap manufacturer that he should not only carefully select his disinfectant and ascertain its purity and efficiency, but should also devote especial care in admixing this ingredient in the right proportion, the exact amount of the medicament being stated on the wrapper of each piece.

The stock or basis of a medicinal soap is by no means unimportant. F. Krafft and A. Stern (*Ber.*, xxvii. 1747), in confirmation of Chevreul's early work, have found that soap in a large quantity of hot water gives a precipitate of the sodium salts of palmitic and stearic acids, while sodium oleate, not being so readily decomposed, remains in solution along with free alkali. An olein basis would therefore seem preferable to the employment of a harder fat.

The alkali of commercial soap is, of course, soda, but *potash* or *soft soap* figures in several Pharmacopœias as "*sapo kalinus*," "*viridis*," or "*mollis*." It is generally made with linseed oil (B.P. Olive Oil), has a pale, brownish-green colour, and is reckoned to be specially beneficial in some skin diseases. It would be useful to determine whether an admixture of a potash soap with the ordinary soda soap would produce a basis giving greater activity when used in such proportion as not to give too great softness to the product. E. W. Lucas has already shown (B.P. Conference, 1894) that a mixture of 1 part potash-soap to 5 of soda-soap solidifies, and can be advantageously employed as a basis for liniments. The solubility of drugs in a potash-soap does not appear to have been investigated.

Unna and others are of opinion that medicaments are more easily absorbed if the soap is "super-fatted," or contains an excess of the fatty menstruum; but however preferable for toilet

purposes as more emollient to the skin, these soaps seem not to be so suitable as vehicles for many drugs as those containing a moderate excess of alkali. The presence of free oils or fats is distinctly inimical to antiseptic action. Koch was the first to point out that carbolic acid dissolved in olive oil, or "carbolic oil," possessed no antiseptic properties. Lenti (*Union Pharmaceutique*, xxxv. 58) concluded from his observations that fatty substances were unsuitable vehicles for disinfectants, as they impeded the germicidal action of mercuric chloride, phenol, and several other bodies. Dr. Breslauer has lately repeated these experiments with various disinfectants, including mercuric chloride, boric acid, nitrate of silver, etc., in union with oil, vaseline, lanoline, etc., and found that while lanoline gave the best results, the presence of the free oil or fat strongly militated against the germicide, various bacilli surviving in oil far longer than in aqueous solutions. Vicario noticed, in 1891, that fixed oils frequently contained germs. From these and other observations it has been recognised that oils and fats used in ointments and soaps must be sterilised by heat; usually this is done in course of manufacture.

It must be remembered that soaps themselves have considerable antiseptic power. Some recent experiments of Max Jolles (*Zeits. f. Hygiene*, 1895, 130) have shown that in the case of typhoid bacilli the disinfecting action is more marked at 4° to 8° C. than at ordinary or higher temperatures, therefore that with cold water they would be more active than with hot. When rags infected with germs were treated with a soap solution the effect was very marked, even a 1 per cent. solution being injurious to the germs in fifteen minutes, and a 6 per cent. solution resulting in their entire destruction. A 3 per cent. solution was fatal in one hour, and in 1 per cent. no germs remained capable of development after two hours' immersion. *B. coli communis* was less easily destroyed at low temperatures; a 2 per cent. solution was fatal in six hours.

There is no doubt that prolonged contact with soap renders surfaces practically sterile, but under common circumstances ordinary soap ceases to be effective. Beyer (*Fortschrit de Medicin*, No. 1, 1897) has shown that in the case of hospital clothing with various surgical stains, soaking the garments in solutions of different soaps for one or two days failed in every instance to kill cholera, typhoid, and pyogenic organisms. He attained success with lime-water in from 24 to 48 hours, but

woollen goods were spoiled. In this case, if the soap had been supplemented by a good antiseptic, more favourable results might have been attained.

With reference to medicinal agents used in soaps, acids and free halogens are obviously incompatible, the former being neutralised by the alkali or precipitating the fatty acid, the latter combining at once with the fat. An alkaline hypochlorite is compatible to a certain extent, but the disinfectant action is much less than that of free chlorine. The oxygen compounds of bromine and iodine do not seem to have been studied in this respect. A vast number of organic bromo- and iodo-compounds have been introduced. Some of them seem to be useful, but most are irritating; the majority have very unpleasant odours.

Fluorides and silico-fluorides were found by Wm. Thompson to be strongly antiseptic and non-poisonous, and were patented under the name of "Salufer." I have not heard of their being used in conjunction with soap, although Thompson states that a solution of sodium silico-fluoride is not irritating, and "is stronger than 1 per 1000 solution of Hg Cl_2 ," and it is obviously compatible with soap.

Sulphur.—Sulphur and alkaline sulphides blend well with soap, and have long been known as useful in skin diseases. Sulphur, even in the form of milk of sulphur, is very slow in its action, on account of its insolubility. The alkaline sulphides are caustic, having been used from Roman times as depilatories; and recently ichthyol and sphagnol have been suggested as convenient means for administering sulphur in soaps. Most of these gradually evolve H_2S , and therefore yield an unpleasant odour, hence are not popular, although this gas is a prominent feature of their antiseptic action.

Boric Acid in soaps would be converted into sodium borate, and would have little efficiency.

Metallic Salts.—These can only be introduced into soap in very small quantities, as nearly all except the salts of the alkaline metals are precipitated in an insoluble form, and in washing disappear from the water in the curd, which can have little effect or value.

Various Oleates or solutions of metallic oxides in oleic acid, more or less well defined as compounds, have been introduced into the Pharmacopœias. They mix well with unguents, and are said to be more readily absorbed, and less irritating than older remedies. Hence it has been proposed to incorporate them with soaps. But since the efficiency of soap depends upon its solu-

bility in water, the curdy precipitate, as mentioned above, is probably inert; since also the oleates of metals are insoluble in water, the question arose as to how far an oxide or an oleate could be made soluble for use in ordinary washing. As an example, I dissolved some zinc oleate, B.P., in a minimum quantity of soda; to the hot clear solution I added 10 grammes of yellow soap, and incorporated. When cold, the soap separated from the mother liquid, which was strongly alkaline and contained practically all the zinc. This process not working, zinc hydrate was prepared and boiled with soda to form a zincate solution as neutral as possible. Yellow soap was then dissolved in the filtered solution, boiled down, and allowed to set. It formed a soap of good washing qualities, not unduly alkaline; on using with water in the ordinary way the zinc was found to be in solution, showing that there was no separation of insoluble zinc oleate. It would therefore seem that metallic oxides dissolved in soda or potash might give better results than the ready-made oleates.

Manganese soap, prepared by double decomposition of manganous sulphate and soap, or by heating manganous carbonate with oleic acid, has been used as a strongly siccative application.

Arsenical soaps have come under prominent notice of late, owing to recent prosecutions, which showed that the amount of arsenic present was almost infinitesimal and quite insufficient for antiseptic or disinfectant properties, although the small quantity with constant use might have some effect on the skin.

The powerfully antiseptic action of *mercury* salts suggested their employment in medicated soaps. It was difficult, however, to prevent the production of the insoluble mercuric oleate, which has little or no germicidal action, and also hinders the formation of a good lather, while any surfaces on which a mercurial preparation is used are liable to become blackened by H_2S : moreover, organic matter is apt to reduce the mercury, and throw it out of the sphere of action. One form of mercurial soap contains mercuric chloride, ammonio-mercuric chloride, together with β -naphthol, eucalyptol, and methyl salicylate. The salts are incorporated with a neutral soap in a dry state in the process of milling, and are therefore, possibly, present unchanged. It is claimed that they are active at the moment of decomposition, as in washing, though afterwards converted into oleate.

The mercury iodide of potassium has even stronger germicidal powers than the chloride. In certain proportions it is easily incor-

porated in the soap stock, and I have found that when dissolved in warm water there is no separation of any insoluble mercury compound. The strength recommended is 1 to 3 of Hg I_2 , and 1 to 3 of KI in 100 of soap. It is said to be effective in a proportion of 1 part of Hg I_2 to 4000 of water. A soap of this kind which is in the market I have found by analysis of some samples to have the following composition in three grades sold:—

Nominal Strength.	KI.	Hg I_2 .	Double Iodide of Mercury and Potassium. KHg I_2 .
3 per cent.	2.25	2.39	3.40
2 " 	0.91	0.63	0.90
$\frac{1}{2}$ " 	0.45	0.26	0.37

More potassium iodide is therefore present than is sufficient to form the double salt. Potassio-mercuric iodide has the advantage of being compatible with strong alkalies, as is shown in the preparation of Nessler test. Moreover, it does not precipitate albumin, and is not easily reduced. According to Dr. Sims Woodhead (*Journ. Soc. Chem. Ind.*, March, 1888), cheaper "carbolate of mercury" soap is not so powerfully disinfectant, and is considerably slower in its action. Obviously mercurial soaps should not be used popularly or indiscriminately. We can conclude with regard to metallic soaps, as it is known that a metal in the form of oleate is readily absorbed by the skin, that if an internal effect is wished for, an oleate soap will succeed; but if a local antiseptic or disinfectant action be required, oleates or other insoluble salts are practically useless, and means must be taken to obtain a mixture like the mercuric iodide soap, or the zinc soap mentioned above, which yields the metal in a soluble form to water. The latter use of soap is obviously the natural one, the former more properly belonging to an ointment or liniment.

Within the last few years I have investigated bacteriologically the relative antiseptic properties of a number of commercial and medicated soaps. In one series comparison was made with a curd soap containing 32.5 per cent. of water and 60.8 per cent. of fatty anhydrides, using for the experiments a 2 per cent. sterilized solution. Inoculation with active bouillon cultures gave results which may be summarised in the tables, + indicating growth and — sterility.

I.—Bacillus Coli Communis in Vigorous Growth.

Time.	Curd Soap.	A Scented Curd Soap.	Carbolic, 10 p. c.	New Disinfectants. A. and B.	Hg I ₂ , 5 p. c.	Formalin, 0.4 p. c.
5 minutes	—	+
15 "	—	+
25 "	—	+
30 " . .	+	+	+	+	—	—
1 hour . .	+	+	+	+	—	—
1½ " . .	+	+	+	+
2½ hours . .	+	+	—	+
3½ " . .	+	+	—	+
				(Much attenuated)		
4 " . .	—	—	—	—	—	—

II.—Staphylococcus Pyogenes Aureus.

Time.	Curd Soap.	Scented Curd.	Carbolic, 10 p. c.	New Disinfectants. A. and B.	Hg I ₂ , 5 p. c.	Formalin, 0.4 p. c.
10 minutes . .	+	+	—	+	—	+
20 " . .	+	+	—	+	—	+
				(attenuated)		
30 " . .	+	—	—	—	—	—
Between 1 and 4 hours . .	—	—	—	—	—	—

The soaps were tried as sold. The relative amounts of disinfectants present in the solutions of the same strength (2 per cent.) would be—

Carbolic . .	0.2 per cent.,	or 1 in 500 of phenol.
A	0.06 " "	1 in 1,666 of disinfectant.
B	0.03 " "	1 in 3,332 of disinfectant.
Hg I ₂ . . .	0.06 " "	1 in 1,666 of Hg I ₂ .
Formalin . .	0.008 " "	1 in 12,500 of formaldehyd.

It will be seen that in these experiments the formaldehyd was used in unduly small quantity, but the results are good.

Carbolic and Cresylic Soaps.—An ordinarily-stated commercial strength of these soaps is 10 per cent., but it is frequently much less. The odour of all forms is very pronounced, and often constitutes an objection. Several varieties are advertised as "of delicate odour," and "not unpleasant in any boudoir," etc. But, although the homologues of cresol have a higher disinfectant power than phenol, they will still, if in effective proportions, manifest their distinctive odour, so that a soap of the tar order, however disguised with eucalyptus, gaultheria, or other scents,

which in themselves, by the way, have little disinfectant value, cannot be free from a more or less tarry odour. A large number of "toilet" soaps are advertised in conjunction with the names of various disinfectants, but contain such an infinitesimal quantity of the reagents as to be quite useless in a germicidal sense; they are, in fact, objectionable as conveying a feeling of a fallacious immunity.

Essential Oils.—The disinfectant power of the essential oils has been much overrated, and to be at all effective they require to be used in such quantities as are liable to cause serious irritation to the skin, many of them having a blistering action as powerful as turpentine or mustard. When desired as perfumes, the amount added should be minute, an over-strength having caused many soaps, otherwise well manufactured, to lose favour. If these ingredients be added to the crutching pan, it is always desirable to neutralise the free alkali at this stage by the ammonium-salt process, or to postpone the addition of the oils until after the operation of fitting. Such has been the reaction against perfumes, that prominent brands are advertised as "unscented" and others as "delicately scented."

Volatile disinfectants, such as phenol, camphor, thymol, etc., suffer considerable loss if introduced in crutching in the ordinary manner, or if added during remelting, so that the quantity present becomes uncertain; it seems, in fact, desirable that all such medicinal soaps should be milled or plotted, as the machines are very convenient for regulating the amount of disinfectant added.

The cakes should evidently be packed in tinfoil (except in the case of mercury soaps, when oiled paper or thin gutta-percha should be used), and should be kept in a cool place. It has been proposed to coat the surface of the tablet with a film of gelatin or wax.

In a series of comparative experiments made in 1896, using 2 per cent. solutions and broth cultures at 37° C. of two representative organisms with the usual precautions, I found that oil of cloves when present in a soap had little antiseptic action.

Time required to kill the organism.

Organism.	Curd Soap.	Carbolic Soap, 3 lbs. per cwt.	Clove Oil Soap, 3 lbs. per cwt.	Clove Oil Soap, 7.5 lbs. per cwt.	Biniodide Soap, 0.5 per cent.	Biniodide Soap, 1.0 per cent.
<i>B. coli communis</i>	Between 2 and 4 hrs.	Between 2 and 4 hrs.	Alive after 6 hours.	Between 2 and 4 hrs.	Less than 15 minutes.	Less than 15 minutes.
<i>S. pyogenes aureus</i>	Organism alive after 6 hours.				Between 1 and 20 min.	Under 15 minutes.

The carbolic and the two clove oil soaps have therefore an antiseptic action equal to, but not exceeding, ordinary curd soap. In the case of *S. pyogenes aureus* the limit of time required to produce disinfection was not reached, but as both the strength and the time much exceeded those which obtain in practice, it was not considered necessary to prolong the experiments. The time had also much exceeded that required by the biniodide.

A comparison of the amount of antiseptic present in the case of the carbolic and mercurial soaps would point to the *à priori* probability of the above results, since the 2 per cent. solution of carbolic soap contained 0.052 per cent. phenol, while the 2 per cent. solution of mercurial soap contained 0.01 and 0.02 per cent. of mercuric iodide respectively; solutions of 1 in 10,000 and 1 in 5,000 of mercuric iodide are known to possess decided antiseptic properties, but a solution of 1 in 2,000 of carbolic acid is practically useless.

Another series of experiments at present in progress have shown the following preliminary results with *B. coli communis* and 2 per cent. solutions :—

Curd soap.—Sterile between 1 and 3 hours.

Zinc soap (made as described in the paper).—Alive after 3 hours.

Carbolic soap.—Sterile between $\frac{1}{4}$ and 1 hour.

Coal-tar soap.—Ditto.

Sanitas soap.—Alive after 3 hours.

Terebene soap.—Ditto.

The variation in these results is influenced by the amount of water present; thus, taking a dry curd soap such as was used in the above experiments in proportion corresponding to soaps containing 33 per cent. and 66 per cent. of water, the following results were obtained :—

	3 per cent. dry Soap.	3 per cent. of Soap containing 33 per cent. Water.	3 per cent. of Soap containing 66 per cent. of Water.
Time required to kill <i>B. coli communis</i> .	Attenuated after 1 hour.	Less than 3 hours.	3 hours.

The PRESIDENT, in passing a hearty vote of thanks to the author, said Dr. Rideal had taken considerable pains in the investigation of this matter. He was sure when they saw the tabulated results,

together with the paper, they would feel satisfied they were of deep interest, and merited all the pains Dr. Rideal had taken in obtaining them. One could not help feeling that very frequently the public were led to believe that they were getting a disinfectant soap, when, in fact, they were not doing so.

Mr. UMNEY remarked that the incorporating of mercuric iodide with soap had formed the subject of a patent.

The author being absent, the next paper was read by Mr. Naylor.

OUR PRESENT KNOWLEDGE OF THE MYDRIATIC GROUP.

BY GORDON SHARP, M.D. EDIN.

It must be acknowledged that our knowledge of atropine, hyoscyamine, scopolamine, hyoscyne, and other bodies, having for their most apparent pharmacological property the dilatation of the pupil, is imperfect. From time to time we have additions to the list of mydriatics, and each one is supposed to possess some signal advantage over its predecessors, but time and trial often proves that the new base differs little, if at all, from our best known mydriatic—atropine. A definite formula is published of each of these atropine-like agents, only to be amended within the next few months, and perhaps further corrected at some future period. The tendency appears to be to an extension of the list, rather than to an increase of our knowledge of the existing members of the class. Such a state of things is far from satisfactory to the chemist, and certainly highly unsatisfactory to the pharmacologist, who nowadays depends so much on his co-worker. If we are to make advances in practical therapeutics, the chemist and the pharmacologist must work hand in hand, for to-day every one must believe in the relationship between chemical constitution and physiological action. If, then, the chemist's work be inaccurate, the pharmacologist's results cannot be trustworthy. The workers in the particular field I now deal with are few in number, because the task is difficult, and it is with the object of gaining increased interest that I have written this paper. Two years ago I sent to the meeting of the British Medical Association in London a paper entitled "The Atropine Group." In this paper I criticised the members of the group, giving details of some work I

had done on the pharmacology and therapeutics. Here is not the proper place to enter into discussions on therapeutical points, but I may be permitted to say I employed hyoscine, atropine, daturine, duboisine, and scopolamine, as ordinarily supplied to us, and I was unable to distinguish between them either pharmacologically or therapeutically.

With this introduction I pass on to shortly review various members of the group, and if my story savours somewhat of complaint and imperfection, I feel sure the members of the Conference will pardon these when they remember I write from the standpoint of the general practitioner of medicine.

Duboisine.

In 1878, Baneroff, of Brisbane, discovered that an Australian plant possessed mydriatic properties. The drug was investigated in this country by Holmes, Gerrard, Ringer, Tweedy, and Murrell, and the belief prevailed that although the active agent in many ways resembled atropine, it yet was distinguished by important chemical and pharmacological differences. But in 1880 A. Ladenburg, as the result of research, found duboisine and hyoscyamine identical, and this he confirmed in the following year. Passing over several years, we find the literature of the subject scanty, but in 1896 Lauterer published the result of his researches on mydriatic plants, and amongst them we find references to *Duboisia myoporoides*. The leaves and twigs of the young plant are said to contain scopolamine, and those of the old plant hyoscyamine. Thus it almost appears beyond dispute there is no such alkaloid as duboisine, and yet we find it figured in text-books and drug lists. This is unfortunate, for so long as manufacturers offer, doctors will buy and use. I am afraid doctors are in the power of the pharmacist to a greater extent than they care to admit.

The samples of duboisine (so-called) which I have obtained are not quite white, but have a brownish tint, and are thus most likely not pure. This may account for the varying results obtained by therapeutists. An impure alkaloid may contain an admixture of piturine, the presence of which would modify the action.

Daturine.

I next consider daturine. It is still supplied as if it were a distinct alkaloid. So long ago as 1850 Pereira hazarded the opinion that in most of its properties it agreed with hyoscyamine, but

Planta was the first to assert the identity of daturine and atropine. In 1877 or 1878 Pochl instituted a series of investigations, upon which he based the opinion that they were not quite identical from a chemical point of view. This was followed in 1880 by Ladenburg's work, the result of which led him to look upon daturine, duboisine, and hyoscyamine as identical, and he further drew the conclusions that there were only two individual mydriatic bases, namely, atropine and hyoscyamine. Whilst conducting these researches, Ladenburg made the discovery that he could convert hyoscyamine into atropine. Working during the same period, E. Schmidt found daturine and atropine to be in every respect identical; but, as I have just now stated, Ladenburg found duboisine, daturine, and hyoscyamine identical. If this be so, then hyoscyamine and atropine are identical. Now a difficulty is introduced, for in 1881 Ladenburg had somewhat shifted his ground, and stated his belief in three individual mydriatic bases instead of two, the three being atropine, hyoscyamine, and hyoscyne. He reasserts his opinion that duboisine and hyoscyamine are identical, but now regards daturine not as identical to these, but as composed of a mixture of atropine and hyoscyamine. In 1882 Pesci, an Italian observer, entered the field of discussion, and gave his opinion that daturine was not identical with hyoscyamine as Ladenburg had said, nor was it identical with atropine as E. Schmidt had asserted. This was adding confusion to confusion. Things remained in this unsatisfactory condition till 1885, when E. Schmidt not only made investigations of his own, but ably reviewed the whole question. He said he had met with crystalline bases under the two names atropine and daturine, and on examination had found them identical. Crude daturine consists of nearly all atropine, but not quite, and so here is the cause of discrepancies of statement. In the same paper he, like Ladenburg, regarded duboisine as not a distinct base, and he came to the same conclusion arrived at by Ladenburg in 1882, that we have only two mydriatic bases, namely, atropine and hyoscyamine—leaving for the present hyoscyne out of the question.

Taking all things together, then, I think we are justified in asking that the term daturine be removed from text-books and commercial lists.

I have purposely avoided the use of the terms "heavy daturine," "light daturine," "light atropine," because they are confusing.

Hyoscyamine.

Coming to hyoscyamine we find our difficulties on the increase. Is there such a base, or is it only another name for atropine? Or is atropine only a conversion product of hyoscyamine? Is there only one fundamental mydriatic base? The following arguments lend some support to the affirmative side of this last question:—

1. The pharmacological action of atropine and hyoscyamine is often indistinguishable.

2. Salts named by one chemist as atropine and employed as such, and giving the ordinary chemical and pharmacological actions of atropine, have, on examination by another chemist, been said to be in reality hyoscyamine.

3. Daturine is identical with atropine, not with hyoscyamine, and yet Ladenburg found the gold salt of hyoscyamine and daturine identical, and E. Schmidt found the gold salt of daturine and atropine identical. But the gold salts of hyoscyamine and atropine are supposed to differ in their properties.

4. It is not the source of the base, but rather the manner of manufacture which determines whether the product is hyoscyamine or atropine.

If hyoscyamine and atropine are not identical, they are closely related, and so close is the relationship, that it is often beyond the ability of the chemist and the pharmacologist to detect the differences.

We need more workers in the field.

Hyoscine.

Perhaps pure hyoscine is a conversion product of atropine or hyoscyamine, but many of the specimens found in commerce are largely made up of atropine, so far as we can judge of them by their therapeutic action. To quote the various views held, abandoned, and reasserted concerning hyoscine would be a long task. One chemist tells us hyoscine is obtained from the mother liquor in the preparation of duboisine and hyoscyamine. Another chemist tells us duboisine is nearly pure hyoscine in face of the statement that duboisine and hyoscyamine are identical. One important point I must not omit. Hyoscine can be prepared from daturine. Now, daturine and atropine are asserted to be identical. May there not then be two stages in the conversion of hyoscyamine?

1. The hyoscyamine converted into atropine.

2. The atropine into hyoscine.

This is only a supposition, but it may explain why so many specimens of hyoscine so-called supplied to medical men give the atropine-like action. This is no lame statement, for in my hands hyoscine has acted like atropine; that is, the alkaloids must have consisted for most part of atropine.

The actual formula is a question of dispute among authorities, Ladenburg giving it as $C_{17}H_{23}NO_3$; O. Hesse as $C_{17}H_{21}NO_4$.

Further reference will be made to hyoscine when I come to speak of scopolamine.

Scopolamine.

In tracing the history of scopolamine, one notes the same obscurities, contradictions, and complexities as we have formerly encountered. There has followed a slow return to simplicity. In this as in everything else human, complexity and little knowledge, simplicity and more knowledge go hand in hand. In 1888 or 1889 the prevailing view was to regard the alkaloids of Japanese belladonna and the Austrian mydriatic plant as a mixture of hyoscyamine, atropine, and hyoscine. In 1892 the chief base of the Austrian plant was named scopolamine, and if I mistake not, E. Schmidt has to answer for this. Now began the battle; O. Hesse said Schmidt's base was nothing more or less than hyoscine.

At this stage of the chemical history the pharmacologist seized upon scopolamine, and after more or less experiment, the new base was declared to be superior to atropine, in not causing dryness of the throat, congestion of the head, or acceleration of the heart's action. Extended experiment has not confirmed this view. In the first list of experiments the dosage was small and the number of trials few. In working on a larger number of cases and increased dose, we are forced to the conclusion that scopolamine acts much in the same manner as atropine. The unwary practitioner who thinks to avoid the uncomfortable effects of atropine is doomed to disappointment. This short digression on the pharmacology and therapeutics of the new base may be pardoned, in that it may help to make clear what I have next to say.

Later investigation leads O. Hesse to modify his views, and he comes to regard scopolamine as not merely hyoscine as he at one time supposed, but as a mixture of hyoscine and a base which he calls atrosine. About the same time E. Schmidt holds the opinion that there is a base scopolamine, and he further makes the startling assertion that the commercial samples of hyoscine are not hyoscine at all, but in reality this new base scopolamine. It

is passing strange if we have been hitherto using hyoscyne in the firm conviction that it is hyoscyne, and obtaining hyoscyne action with it, and yet Schmidt tells us it is not hyoscyne at all, but scopolamine. Later investigation confirms Schmidt in his formerly expressed opinion, but he makes a very important remark. He tells us the properties of this base, scopolamine, differ greatly according to the methods of preparation, and this may serve to explain why observers obtain varying results with the salts supplied to them. Hesse after further work is equally confident of the accuracy of his assertions, and says the so-called scopolamine consists largely of hyoscyne. Moreover, he suggests the name scopolamine should be discontinued. In this I feel inclined to agree with him.

After all this so-called scopolamine may be nothing more or less than an impure atropine or hyoscyamine (compare Lauterer under the heading Duboisine). Considered purely from the pharmacological and therapeutical standpoints, scopolamine has in my hands given the typical atropine action.

To gather up the ends of our statement and to make something after the form of a summary, we find as follows:—

1. The names daturine and duboisine should be given up.
2. The relationship of atropine and hyoscyamine can hardly be said to be clearly understood. If this point were cleared up, much would be gained, and the way paved for further investigation of the other members of the group.
3. Of hyoscyne one can say little. It is like atropine in its action.
4. Scopolamine cannot lay claim to be a new base.

The artificial alkaloids to which the name tropines has been given do not concern us. Lastly, I should like to say that where a decided statement is made it is as the result of my own observations, pharmacological and therapeutical. This I think necessary to mention, so that I alone am to blame for any inaccuracy of observation. The historical and other notes are of course common property. The whole I bring before the members of the Conference with the sincere desire that interest may be increased on the important question I have endeavoured to discuss.

The PRESIDENT said this paper was really a very valuable one, and was well worthy of perusal, containing as it did a large amount of historical data.

Dr. Gordon Sharpe was warmly thanked for his paper, and the reading and discussion of papers were here brought to a close.

The following paper was intended to be read at the Glasgow meeting of the British Pharmaceutical Conference, but was received too late for that purpose :—

KINOS.

THE OFFICIAL VARIETY IS NOW ALMOST UNOBTAINABLE: CAN ITS PLACE BE EFFECTIVELY SUPPLIED BY OTHERS MET WITH IN COMMERCE?

B.P.C. Blue List, Question No. 49.

By JOSEPH BOSISTO, C.M.G.,

Honorary Member of the Pharmaceutical Society of Great Britain, etc.

The question submitted under the above heading is answered from Victoria, Australia, to the following extent :—

That although the *Pterocarpus marsupium* and other species of the natural order Leguminosæ yielding kino is not known to exist in Australia, yet the natural order of Myrtaceæ, which exists throughout Australia, in many of its manifold species exude kinos and some catechus. These at present (save and except one) have not been found capable of commercial value, arising from their sparse solubility in water, or in any known cheap solvent. This arises from the gum kino not being collected within a few days after its appearance on the outer bark. The extreme bright sunlight of Australia, together with the warm thermal lines existing both night and day, suffers it to rapidly undergo change into a degraded Bassorin—insoluble.

Quantities of such-like kinos exist throughout Australia, obtainable chiefly from *Eucalyptus marginata*, *Eucalyptus amygdalina*, *Eucalyptus sideroxylon*, *Eucalyptus tissilis*, and many others.

The one I have already indicated is the *Eucalyptus rostrata*, from which is exported annually about two tons of its gum. This is almost entirely soluble in water, and is a true kino. It is mentioned in *Squire's Companion to the B.P.*, 1882, as "Gummi Rubrum," from the *Eucalyptus rostrata*, and in Martindale's *Extra Pharmacopœia*.

The *Eucalyptus rostrata* species is one of the leading trees in many of the forests of Victoria, and is so productive of this kinic substance that, being unable to force its way through the hard,

tough outer bark, lodges itself in treacle form in large orifices or carbuncles between the wood and the bark, in such quantities that I have known *one and two* bucketsful of the liquid obtained by boring a small orifice into the swollen part.

This liquid kino, when evaporated in a vacuum pan, is obtained as beautiful ruby red gum kino, thoroughly soluble in water or spirit.

The supply from Australia would be very great if only a remunerative market opened.

GENERAL BUSINESS.

The Unofficial Formulary Committee.

MR. JOHN C. UMNEY moved that the following gentlemen of the Formulary Committee be re-elected: W. Martindale, F.C.S.; W. A. H. Naylor, F.I.C., F.C.S.; A. C. Abraham, F.I.C., F.C.S.; T. Greenish, F.C.S., F.R.M.S.; T. B. Groves, F.C.S.; T. Maben, F.C.S.; N. H. Martin, F.I.C., F.R.M.S.; F. Ransom, F.C.S.; R. Reynolds, F.I.C., F.C.S.; Dr. C. Symes, Ph.C.; and R. Wright, F.C.S.

In moving the resolution he said he supposed until the Pharmacopœia was published there would be no report from this Committee.

MR. COULL seconded the resolution, which was carried unanimously.

THE PRESIDENT said as soon as the Pharmacopœia was published they would get to work, and, as had been suggested, try to improve on it in the formulary which would be published.

Presentation from the Bell and Hills Fund.

THE PRESIDENT then presented to Mr. Currie, as the President of the Local Association of Glasgow and the West of Scotland, the books from the Bell and Hills Fund, consisting of Tyndall's *Fragments of Science* (two vols.), Tyndall's *Floating Matters of the Air*, Tyndall's *New Fragments*, Green's *Manual of Botany* (two vols.), Atkinson's *Elementary Physics*, Sutton's *Volumetric Analysis*, Helbing's *Modern Materia Medica*, Attfield's *Chemistry*, and *Taylor on Poisons*; also the *Pharmacographia*, and science papers from Mr. Thomas Hanbury in memory of his late brother, Mr. Daniel Hanbury.

MR. CURRIE said it afforded him the greatest pleasure to accept

the books on behalf of the Local Association, they would be a valuable acquisition to the library, and would be very much appreciated.

Place of Meeting for 1898.

Mr. McKNIGHT (Belfast) said that at a representative meeting of the pharmaceutical chemists and chemists and druggists of Ulster, held in Belfast in the month of May, it was unanimously decided to offer the British Pharmaceutical Conference an invitation to visit Belfast in 1898. Sir J. Haslett, M.P., Mr. J. C. C. Payne, Mr. S. Gibson, and himself, as representing the drug trade generally, were appointed a deputation to come to Glasgow to offer the invitation personally. He regretted exceedingly the absence of Sir J. Haslett and Mr. Payne, both of whom were unable to be there, the former on account of business and the latter through illness, as their persuasive eloquence would have pictured the city and trade of Belfast in such a brilliant colour that the delegates would not have hesitated to proclaim their willingness to visit Belfast. The renewal of that invitation, made last year at Liverpool, reminded him of an assertion that was sometimes made—that Irishmen always required a second chance, and he was forced to the conclusion that there must be some truth in the allegation. Last year Mr. Payne and himself, when they offered their invitation, were ruled out of order. This year he thought they would give them credit for being in order. On behalf of the pharmacists and chemists and druggists of Ulster, he offered them a hearty invitation to Belfast next year. He need hardly tell Scotchmen of what they would see, for the reason that Scotland and Ulster were bound together by family ties, which had made Ulstermen as much Scotch as the Scotch themselves; but for the information of South of England gentlemen, he must say that they would see a city which was the seat of two important industries—the ship-building and the linen trade. Belfast-built ships were known all the world over, and eclipsed anything that could be launched from the Clyde, while Belfast linens are known in every country in the world. While they could not boast of such grand scenery as could be seen in the vicinity of Glasgow, they could show them a country of picturesque beauty, with cultivated plains and undulating woods, that would be an agreeable change to the bold and wild Scotch mountain scenery, on which they had been feasting their eyes for the past three days, and which they would see more of the following day.

He might say, on behalf of the pharmacists of Ireland generally, that they sympathise with the object of the Conference, and would only be too willing to participate in its work if they would only visit them in Ireland.

Mr. SAMUEL GIBSON, in support of the invitation, said he appeared there as the delegate of the Chemists and Druggists' Society of Ireland to bid the Conference hearty welcome to their city next year. He regretted that the President of their Association, Sir James Haslett, M.P., was unable to appear in person to-day, but he had asked him to read the following letter: "I very much regret my inability to accompany you to Glasgow, as I am obliged to attend several important meetings here on Tuesday and Wednesday. May I ask you to press as strongly as possible the opinion of our united bodies that the members of the British Pharmaceutical Conference should visit Belfast next year. We will do our utmost to make their visit pleasant." Continuing, Mr. Gibson said that coming here, and seeing the efforts which their Glasgow friends had put forth to make the visit of the Conference pleasant and profitable, he felt that a very difficult task lay before them in Belfast. But, as Mr. McKnight had told them, there was a little Scotch blood in nearly all their veins, and with that they had united a little Irish recklessness. They could never attempt to do as well as their Glasgow friends had done, but they would do their best. They would promise them that. Of course in going over to Ireland they would have to cross the stormy waters of the Irish Sea, but when they got over that they would do their utmost to make the visit of the Conference profitable and pleasant. It was natural that having visited the commercial capital of Scotland, they should go to see something of the commercial capital of Ireland. Of course they had not an ancient city like Glasgow to show them, and they had not the beautiful surrounding scenery that they had on the Clyde; but they would show them a busy hive of industry, teeming with mills and factories. He concluded by assuring them of a very hearty Irish welcome.

Mr. WELLS stated that, as President of the Pharmaceutical Society of Ireland, it was right that he should add a word to the very hearty invitation the Conference had just received. When they met in Ireland some nineteen years ago, it was on the invitation of the pharmacists of the whole of Ireland; but on this occasion their Ulster friends were determined that they would have the whole honour and glory of the reception. While those

in the capital did not make any objection, of course their Belfast friends would have the advantage of them. He hoped it would not be very long before he himself, or some other pharmaceutical friend from Dublin, would have the honour of giving them a hearty invitation to visit them in Dublin again. He claimed also, as the head of the Pharmaceutical Society, to speak for the whole of Ireland on this occasion. Mr. McKnight had referred to the bond that tied Glasgow and Belfast, and indeed Belfast was always looked upon in Ireland as a little bit of Scotland. He also had the privilege of a little bond in that way in Belfast, because, he explained, his wife was a Belfast lady, and he also could support this invitation. He knew that the Belfast people would give the Conference a very hearty welcome. Mr. Wells further alluded to the importance of Belfast as a ship-building centre, and remarked that perhaps by-and-by the Ulster city would beat the Clyde in that industry.

Mr. ATKINS said that it was with extreme pleasure he rose to move that the Conference at once accept the hearty invitation from Ireland. He was quite sure Belfast would do its duty and rise to the occasion. They knew by report—at least, he knew by report—what a magnificent city it was, and they knew its wonderful industries. He had read that it had scenery even surpassing the description given by the modest gentleman who had sounded its praises. They only asked one thing, and that was that when they got there they would not need any ulsters. If their Irish friends would only arrange for sunshine, he was quite sure all the other things would follow. It was twenty years since the Conference was in Ireland last. He at once, on behalf of the Conference, heartily accepted this invitation, which had been so cordially extended to them.

Mr. TYRER seconded the motion, saying that he knew Belfast well. He had been in the Ulster capital, and he was quite sure they would be well treated.

The PRESIDENT said they had been treated with courtesy everywhere they had visited, and he was quite sure they would have the same warm-hearted enthusiasm at Belfast which those who had visited Dublin had enjoyed.

The resolution was put and carried with acclamation.

Meeting of the Conference in 1899.

Mr. SAVAGE, of Brighton, wished to remind the Conference that there was a place called Brighton, and he asked the members to

hold themselves free to visit it in 1899. He pointed out the advantages that the town held out, and said that they would give a most hearty welcome if next year they agreed to this proposal. In making this request he spoke on behalf of Hove as well as of Brighton.

The PRESIDENT said it was not possible for the Conference to accept an invitation so far ahead, but still he recognised that the formal invitation would come next year. It was many years since they had visited the south, and he had no doubt that the invitation when made would be gladly accepted.

ELECTION OF OFFICERS FOR 1897-98.

The following officers were unanimously elected for the ensuing year:—

President.—Dr. C. Symes, Ph.C., Liverpool.

Vice-Presidents.—Walter Hills, F.C.S., London; J. Laidlaw Ewing, Edinburgh; W. F. Wells, junr., Dublin; J. C. C. Payne, J.P., Belfast.

Treasurer.—John Moss, F.I.C., F.C.S., London.

General Secretaries.—W. A. H. Naylor, F.I.C., F.C.S., London; F. Ransom, F.C.S., Hitchin.

Local Secretary.—R. W. McKnight, Belfast.

Other Members of the Executive Committee.—F. C. J. Bird, London; H. Collier, F.C.S., London; E. H. Farr, Ph.C., F.C.S., Uckfield; Prof. H. G. Greenish, F.I.C., London; James Guiler, Belfast; J. A. Russell, Glasgow; J. C. Umney, F.C.S., London; Edmund White, B.Sc., London; R. Wright, Ph.C., F.C.S., Buxton.

Auditors.—W. L. Currie, Glasgow; D. W. Elliot, Belfast.

VOTES OF THANKS.

Mr. WELLS then proposed—

“That the hearty thanks of the meeting be accorded to the Corporation of Glasgow for granting the use of the Art Galleries for the reception by the President of the Pharmaceutical Conference.”

They had all enjoyed the reception, and derived great pleasure from going through those beautiful rooms.

Mr. BIRD had very much pleasure in seconding the resolution. All those who were fortunate enough to be present on Monday evening would retain the most pleasant recollection of the enjoyable music that was provided for them, of the valuable works of art which they inspected, the true Scottish hospitality which they

enjoyed, and the courtesy extended to them by the pharmacists of Glasgow.

Professor ATTFIELD moved—

“That the heartiest thanks of the non-resident members of the Conference be given to the Local Committee, and particularly to Mr. McAdam, the chairman; Mr. Currie, the vice-chairman; Mr. John Walker, the treasurer; and Mr. Russell, the secretary; for their very successful efforts in making and carrying out the local arrangements of this meeting.”

No one could appreciate better than he could the importance of the work that was done by the Local Committee, for as a Conference Secretary he had had to deal with such committees for the first seventeen years of the life of the Conference, and when the Conference met in London he was himself on the Local Committee. There were others in the room who had been on such committees, and they too would appreciate the efforts that had been put forth to make this meeting a success, for that it was a success would be admitted by every lady and gentleman present. As for the ladies they would realize, knowing what their position was at home, that those generally who had the least credit did most of the work in maintaining an institution. All the officers of the Conference and those who read papers and so became known and received credit, should be the very first to remind every other member and visitor present that the chief labours of arranging for the Conference lay with those who worked quietly sometimes for many months beforehand in order that all might have a few delightful days. Whether they looked to the arrangements for the scientific work of the Conference in the room in which they were assembled, or looked to the social arrangements which had been made for their pleasure, they would all agree that the gentlemen of the Local Committee who had been doing this work should realize, not only for the moment, but permanently, that their labours were appreciated.

Mr. MARTIN said Professor Attfield had so eloquently voiced their gratitude to the Local Committee that his own task in seconding the vote of thanks to the Local Committee was a very light one. He had had some experience as a member of the Local Committee and knew something of the work that body had to do, and he would say that the debt of gratitude which they owed to its members could not be easily expressed in words.

When the members of the Conference came from all parts, they found everything made smooth for them; the best scenery of the district was laid open to them and they were guided to it without loss of time. There was the minimum of trouble inflicted on each member of the Conference and the maximum of enjoyment. There was only one thing that the Local Committee had not been able to do, and that was to control the weather.

The resolution was carried amid cheers.

Mr. McADAM, in returning thanks, said if the Conference were satisfied with the arrangements that had been made, the Local Committee were amply rewarded.

Mr. CURRIE said when he visited Liverpool last year and extended the invitation to come to Glasgow, he made some very large statements. He said it was to visit the second city of the empire. He did not retract one bit from that, and he thought he was supported in the statement by the record attendance. He was only a humble member of the committee, the whole body of which had worked like one man. There must always be one or two moving spirits in a committee such as this, but if those moving spirits were not supported by the rank and file the result would be very poor work indeed.

Mr. RUSSELL said he had no doubt that the success of the meeting and the fact that he, as Secretary, had felt the work to be so light, had been due to the fact that they had managed to get it sub-divided, and the different sub-committees had worked well into each other's hands. Whatever work they had had to do, they had been more than repaid for by the kindness with which their efforts had been appreciated. They might rest assured that it would not be another twenty-one years before the Conference were again invited to Glasgow.

Mr. WALKER endorsed all that his colleagues had said. They had been told at the Liverpool meeting that they would find it difficult to beat that meeting; they had not set themselves to beat the Liverpool meeting, but to do at least as well.

Mr. Walker then cordially thanked the Conference for their vote of appreciation.

Mr. WALTER HILLS then proposed—

“That the Conference accords to the President a very hearty vote of thanks for the ability and courtesy which he had shown in the conduct of the meeting.”

His task in moving this resolution was a very easy one, because

he knew it would be received with the greatest cordiality and enthusiasm. He was quite sure that they would all agree that this had been a very successful meeting. There were many factors which tended to make such a meeting successful—they might have a splendid city such as Glasgow, or an abundant supply of pure water both for internal and external application, they might also have a very energetic local committee to offer them a welcome and to make arrangements for their comfort, they might have an untiring executive and honorary secretaries, but after all much depended on the character of their President, and his conduct in the chair, with which, he felt sure, all were well satisfied. He had been a colleague of Dr. Symes on the Council of the Society for many years, and he had learnt to appreciate his work. Dr. Symes was regarded as a typical pharmacist, interested in everything which had to do with the advancement of their calling.

Mr. Druce said they might have two opinions, at least those who visited Glasgow for the first time, as to the character of the Scotch weather, but there could be no two opinions as to the way in which the President had carried through the Conference. He was quite sure they would all endorse what Mr. Hills had said.

The resolution was put and carried with acclamation.

The President said the task which he had had to perform had been simple and easy compared with his present one, if he attempted to express his feelings adequately in speech, but at that late hour he would not detain them by attempting to respond at any length. The duties which devolved on the President were not so heavy as they may suppose. The President for the first year of his office found himself short of a good deal of information connected with the working of the Association, even though he might have attended the meetings frequently; but his work was very much lightened by the immense amount of help which he received from the honorary secretaries. The men who did the work of the Conference, otherwise than the Local Committee, were practically the honorary secretaries, and their very best thanks were due to those gentlemen for their labours, and the courteous manner in which they assisted the President and the Executive Committee in their work.

The proceedings of the Conference then terminated.

THE EXCURSION.

A Day's Cruise on the Firth of Clyde, Western Lochs, and through the Kyles of Bute.

It was a great relief to find that Thursday, August 12th, promised to be a fine day, as the success of the programme for the excursion was necessarily dependent upon the weather.

About 450 members of the Conference and their friends left St. Enoch Station by special train at 8.55 a.m. for Greenock, which was reached at about 9.40.

Here the company embarked on the fine steamer *Glen Sannox*, for a day's cruise.

Passing down the Firth of Clyde, numerous places of interest and beauty were seen, including Milltown and Dunoon.

On entering the Kyles of Bute the coast scenery improved, and being fresh to many members of the party, quite surpassed their expectations. After passing round the island of Bute the peaks of Arran came into view, and in the far distance to the south the rock of Ailsa Craig was distinctly visible.

On the return Loch Long and Gareloch were visited, and at Arrachar, at the head of the former, the party was landed for the purpose of being photographed.

At Gareloch Head a deputation landed to visit Mr. Daniel Frazer, an old member of the Conference, who now resides at this romantic spot. The return was then made to Greenock, which was reached at 7.15.

The arrangements on board for the comfort of the large company were admirable, and no hitch of any kind marred the complete enjoyment of a perfect day.

RECEPTION AND CONVERSAZIONE.

The Reception by the President and Mrs. Symes was held in the Corporation Art Galleries at 8 p.m. on Monday, August 9th, by kind permission of the Glasgow Corporation.

The Reception was followed by a *Conversazione*, which afforded a pleasant opportunity of reviving old friendships and making fresh acquaintances. The works of art, which form one of the finest provincial collections in the kingdom, were much-admired, and the music provided also added to the entertainment.

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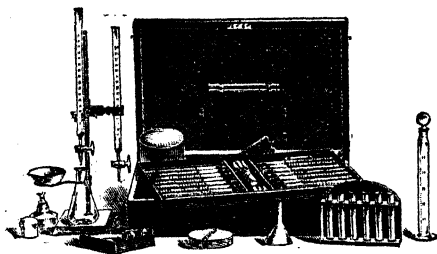
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Oxalic Acid.	Sodium Chloride.
Sodium Carbonate.	Mercuric Potassium
Iodine.	Iodide.
Sodium Thiosulphate.	Fehling's Test, modi-
Potassium Dichromate.	fied (Cupric Tar-
Silver Nitrate.	trate, Alkaline).

Qualitative Test 'Soloid' List.

Ammonium Carbonate.	Mercuric Chloride.
Ammonium Chloride.	Oxalic Acid.
Ammonium Molybdate.	Picric Acid.
Ammonium Oxalate.	Potassium Chro-
Ammonium Phosphate.	mate.
Barium Chloride.	Potassium Ferri-
Barium Sulphide (for	cyanide.
preparing Hydrogen	Potassium Ferro-
Sulphide and Ammon-	cyanide.
ium Sulphide).	Potassium Iodide.
Capric Sulphate.	Potassium Iodide
Ferric Ammonium Sul-	and Starch.
phate.	Sodium Phosphate.
Lead Acetate.	Tannic Acid.
Magnesia Mixture.	Tartaric Acid.
Magnesium Sulphate.	Zinc.

'Soloid' Indicators.

Indigo Carmine.	Phenolphthalein.
Lacmoid.	Rosolic Acid.
Methyl Orange.	Starch.

Apparatus.

- 2 20-c.c. burettes, with enamelled glass back, glass stop-cock, and graduated to 1/10-c.c.
- 1 50-c.c. glass-stoppered, graduated glass measure.
- 12 test tubes.
- 1 registered test tube stand (B. W. & Co.).
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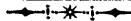
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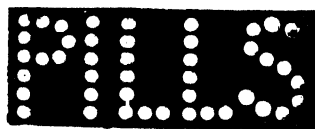
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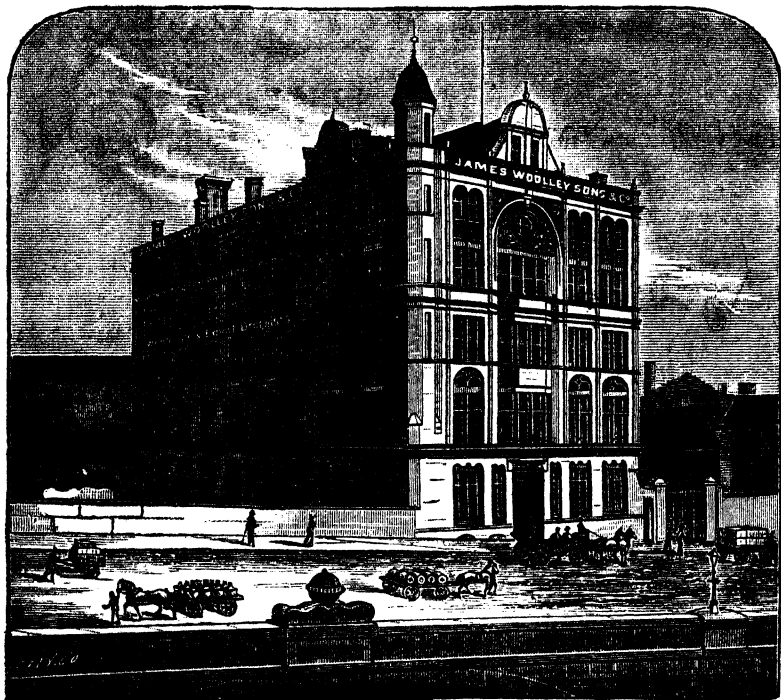
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Carriage paid on No. 3 size and upwards. All tins free. No return Empties. Specially adapted for Export.			

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1 gall. to 50 galls. of water.

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Drums and Casks allowed for in full when returned, carriage paid, within two months.
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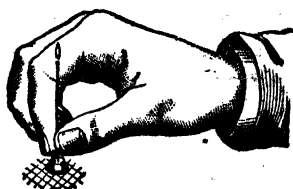
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Vaccination from the Calf daily from 11 to 12 o'clock.

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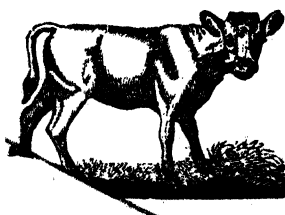
Tubes	Large	2s. each, or 3 for 5s. 6d.
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	Bots.	½ Bots.	Bottles.	½ Bottles.		Bots.	½ Bots.	Bottles.	½ Bottles.
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Apollinaris	6/-	5/-	50	33/-	100	36/-
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Franz-Josef	13/-	10/-	25	23/-	50	40/-
Friedrichshall	5/-	4/-	50	20/-	50	15/-
Gerolstein	12/-	10/-	25	22/6	50	35/-
HUNYADI JÁNOS	5/6	4/-	50	21/-	100	32/-
Johannis	9/-	..	50	36/-
Kronenquelle	8/6	..	50	35/-
OBERBRUNNEN
Levico	15/-	8/-	12/-	5/6	4/6	15/-	8/-	40	36/-
Pullna	5/6	4/6	50	21/-	50	21/-
Reginaria	5/6	4/6	50	22/-	100	35/-
Reislof	5/6	4/6	50	20/-	100	32/-
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Royat	15/-	8/-	25	30/-	100	60/-
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23 CARRIAGE PAID excepting SALUTARIS.

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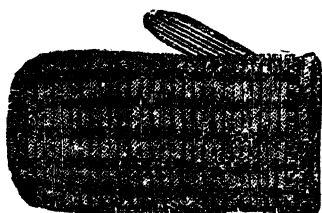
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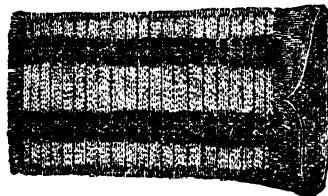


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For cleaning and softening the hands,  
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For wet or dry use. Hair on both sides.  
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For wet or dry  
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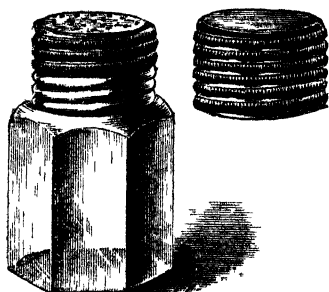
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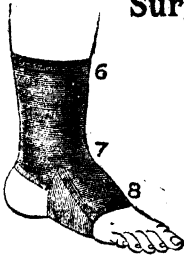


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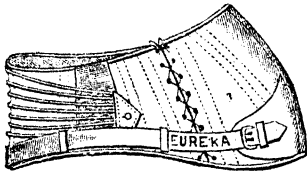
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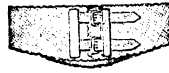
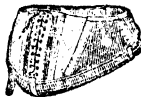
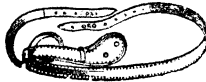
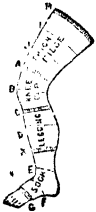
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Elastic Surgical Stockings, Knee Caps, etc.  
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For Applying Small and Measured Quantities of Medicaments to the Larynx, Pharynx, and Nasal Cavity.

The only Spray Apparatus on the market which can be adjusted so as to produce either a fine or coarse spray.

Write for List of Prices, Press Opinions, and Descriptive Circulars, to the Patentee—

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R. HOVENDEN & SONS having purchased under an administration suit the business of the late A. S. LLOYD, with the receipt, trade mark, and goodwill of the celebrated Euxesis, the trade are cautioned that the original and genuine Euxesis is now manufactured at our Factory ONLY, and may be obtained at either of our Warehouses.

The label is printed with Black Ink only on a yellow ground, with our Trade Mark at the bottom.



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Recommended by  
Sir ERASMUS WILSON, &c.

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is by far the best article for

**SOFTENING WATER FOR TOILET PURPOSE.**

Is largely patronised by the Nobility in London and other hard-water districts.  
(Shows a good profit to retailers.)

**W. TAPP & CO., Bristol.**

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# Hunyadi János

A very interesting and important contribution on Natural Mineral Waters of the purgative saline type was published in the report of a Special Analytical Commission in *The Lancet* of December 5th, 1896. This report is made all the more interesting and reliable from the fact that a *Lancet* Commissioner personally visited the Saxlehner Springs, near Buda Pesth, and obtained samples on the spot, which were subsequently analysed in *The Lancet* Laboratory, and the results obtained compared with samples purchased at a number of shops in London. The results showed that **HUNYADI JÁNOS, the Prototype of all Bitter Waters**, was, wherever it might be obtained, a water showing a **perfect uniformity of composition**, and one that could be **relied upon absolutely as at all times being identical** with that drawn from the Spring and fountain head. The numerous analyses in *The Lancet* Report give very striking evidence not only of the **honesty of the water**, but bear out also the **remarkable uniformity of composition** that has characterised **HUNYADI JÁNOS** for a **third of a century**. Thus, the results recently obtained in *The Lancet* Laboratory accord exactly with those obtained in Liebig's Laboratory over thirty years ago. **Nothing could be more satisfactory than this from the therapeutic point of view.** Practitioners can thus depend upon the water they prescribe, and may be assured that when **HUNYADI JÁNOS** is administered, <sup>Keighley.</sup> **effects will always be the same and with the same good results.** As is pointed out in the Report, an important feature in **HUNYADI JÁNOS** Water is the constancy of ratio of the active saline constituents to each other. The sodium and magnesium sulphates are together in almost exactly equal proportions, so that **what therapeutic property is lacking in the one is balanced by the other.** Neither the sodium sulphate nor the magnesium salt are in excess of each other. **In this way the purgative effect is not drastic, but mildly yet decidedly effective.** Again, besides these chief medicinal salts there are present in important quantity also in **HUNYADI JÁNOS** Water, Sodium Chloride, Sodium Carbonate, and Lithium Chloride. It cannot be doubted that each of these constituents contributes towards the **favourable action of the water**, which has for so long been a **distinctive and satisfactory feature attending its administration.** Last, but by no means least, the report of *The Lancet* Commission shows that **HUNYADI JÁNOS** Water is bottled under **admirable sanitary precautions.** In the details of the analyses given there was not the slightest indication that **HUNYADI JÁNOS** Water contained any objectionable organic matter from whatever source. While therefore the medicinal properties of **HUNYADI JÁNOS** as a natural aperient are **sure and reliable**, it is **safe** also from the very important fact of its **extreme organic purity.**

Proprietor—

**ANDREAS SAXLEHNER, BUDAPEST.**



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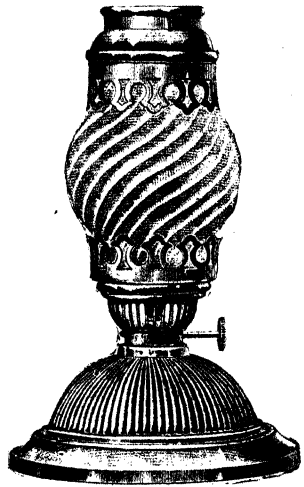
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